1st Edition

As per NCISM Syllabus

Text book of Swasthavritta Evam Yoga

Course Curriculum for Second Professional BAMS
(Prescribed By NCISM)

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Dr. Bargale Sushant Sukumar
Dr. Shashirekha H.K.

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Chapter 1

Swastha and Swasthya

Syllabus

Definition of Swasthavritta and its objective. Swastha Lakshana, Arogya Lakshana, Dhatusamya Lakshana. Concept of Health & Operational definition of health. Importance of Shodhana in Swastha in relation to Sanchita & Asanchitha Dosha & Classification of Swastha purusha as Sanchita dosha and Asanchita Dosha. Dimensions of health -Physical, Mental and Social. Concept of well-being: objective component of well-being - standard of living and level of living and subjective component of well-being - Quality of Life. One health concept / Vasudhaiva Kutumbakam or "One Earth - One Family-One Future".

Learning objectives

1. Define Swasthavritta and describe its objective.
2. Describe and compare Swastha Lakshana Arogya Lakshana, Dhatusamya Lakshana. Describe Concept of Health & Operational definition of health.
3. Describe the Importance of Shodhana in Swastha in relation to Sanchita& Asanchitha Dosha & Classify Swastha purusha as Sanchita dosha and Asanchita Dosha.
4. Explain the Physical, Mental and Social dimensions of health.
5. Describe the objective component of well-being - standard of living and level of living and subjective component of well-being, Quality of Life.
6. Explain one health concept / Vasudhaiva Kutumbakam or "One Earth - One Family One Future"

Total - 3 hours (Lecture :03 hour, Non-lecture: 00 hours)
MCQ- Yes- SAQ (5 Marks)- Yes- LAQ (10 Marks)- No

Definition of Swasthavritta and its Objective

The term Swastha means healthy individual and Vritta means actions or regimen thus Swasthavritta denotes the actions or regimen which can be observed to maintain the health of a healthy individual and to prevent the diseases.

सुष्ठु अवतिष्ठते नीरोगत्वेनेति स्वस्थः, तस्य वृत्तिः स्वस्थरूपतयाऽनुवर्तनं, तत्र स्वस्थवृत्तौ मतमभिमतं पूजितमिति यावत । (चक्रपाणिदत्त च.सू. 1/67)

Chakrapani commenting on Swasthavritta mention the condition free from disease is Swastha (healthy) and regimens followed to keep one self-healthy is Swasthavritta.

The substances which help in maintaining, promotion and preservation of the health of the healthy persons are Swasthavritta Hitakara. Rasayana and Vajikarana as well as daily (Dinacharya) and seasonal regimens (Rutucharya) etc. are belonging to this group. Rakta Shali (red rice), Purana Shali (old rice), Godhuma (wheat), Yava (barley), Mudga (green gram) Saindhava Lavana (rock salt), Amalaki (Gross Berry), Yava (Barley), Antariksha Jala (Rain Water), Paya (Milk), Ghrita (Ghee), Jangala Mamsa (Meat) and Madhu (Honey) etc. are good for daily use to maintain and promote health. The primary function of the substances under this category is to maintain the equilibrium of the Dosha so that they are neither

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increased/aggravated nor decreased. Thus, they help normal functioning of the body.

Objectives

1. To understand and practice principles of Dinacharya (daily regimen), Rutucharya (seasonal regimen) and Ayurveda diet regimen for promotion of health.
2. To understand practice Yoga and Naturopathy
3. To provide Health management services to the community
4. To provide preventive services to the society in respect to communicable, non-communicable disease.

Swastha Lakshana, Arogya Lakshana, Dhatusamya Lakshana.

Swastha Lakshana

समदोषः समाग्निश्चसमधातुमलक्रियः ।
प्रसन्नात्मेन्द्रियमनाः स्वस्थइत्यभिधीयते ॥
(सु.सू. 15/41, भा.प्र. 5/14)

The features of a Swastha Purusha (healthy man), Doshas (Vata, Pitta, Kapha), Agni (digestive fire), Dhatus, Malas (waste products) and Kriyas are normal, Atma (soul), Indriya (sense organ) and Manas (mind) are peaceful is said to be Swastha (healthy).

Swastha (health) means all Doshas, Agni, Dhatus, Malas are in the state of equilibrium along with mental, sensory and spiritual pleasantness and happiness.

सुष्ठु निर्विकारत्वेनावतिष्ठत इति स्वस्थः तस्य भावः स्वास्थ्यम् ॥ (चक्रपाणिटिका च.सू. 5/13)

The person without any abnormality or any disease is known as Swastha (healthy).

रोगस्तुदोषवैषम्यंदोषसाम्यमरोगता ।
रोगाः दुःखस्यदातारोज्वरप्रभृतयो ते ॥
(भा.प्र.)

Abnormal state of Dhatus which produces Dukha is Vikara (disease). Balance or normal state of Dhatus which produces Sukha is Prakruti is Arogya (Health).

Arogya Lakshana/Lingani-According to Kashyapacharya

अन्नभिलाषो भुक्तस्य परिपाकः सुखेनच ।
सृष्टविन्मूत्र वातत्वं शरीरस्य तु लाघवं ॥
सुप्रसन्नेन्द्रियत्वं च सुखस्वप्नप्रबोधनम् ।
बलवर्णायुषो लाभः सौमनस्यं समाग्निता ॥
विद्यादारोग्य लिङ्गानि विपरिते विपर्ययम् ।
(का.सं.खि. 5/6)

- अन्नभिलाष- Desire for the intake of food
- भुक्तस्य परिपाकः सुखेनच- Proper and easy digestion of the ingested food,
- सृष्टविन्मूत्र वातत्वं- Evacuation of faeces, urine and flatus properly,
- शरीरस्य तु लाघवं - Lightness in the body,
- सुप्रसन्नेन्द्रियत्वं- Pleasantness in sense organs,
- सुखस्वप्नप्रबोधनम् - Proper timely sleep and awakening,
- बलवर्णायुषो लाभः- Increase the Bala (gain of strength), Varna (increase complexion), Ayu (increase life span),
- सौमनस्यं- Pleasant mind,
- समाग्निता - Normal Agni.

These features of the Arogya (health) and opposite state is Vikara (illness).

Anindita Purusha / Prashasta Purusha Lakshana

सममांसप्रमाणस्तु समसंहननो नरः ।
दृढेन्द्रियो विकाराणां न बलेनाभिभूयते ॥
क्षुत्पिपासातपसहः शीतव्यायामसंसहः ।
समपक्ता समजरः सममांसचयो मतः ॥
(च.सू. 21/18-19)

- सममांसप्रमाणस्तु - Person endowed with well-formed muscles,
- समसंहननो नरः- Compactness,
- दृढेन्द्रियो विकाराणां न बलेनाभिभूयते- Strong sense organs will not be afflicted with diseases,
- क्षुत्पिपासातपसहः शीतव्यायामसंसहः- Stand hunger, thirst, heat, cold and exercise,
- समपक्ता समजरः - Food gets digested and gets assimilated properly,

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• **सममांसचय** - Resulting in proper nourishment of Mamsa and all other Dhatu.

Dhatusamya Lakshana

कार्यधातुसाम्यं, तस्यलक्षणंविकारोपशमः । परीक्षात्वस्य-रुगुपशमनं, स्वरवर्णयोगः, शरीरोपचयः, बलवृद्धिः, अभ्यवहार्याभिलाषः, रुचिराहारकाले, अभ्यवहृतस्याहार-स्यकालेसम्यग्जरणं, निद्रालाभोयथाकालं, वैकारिणांचस्वप्ना-नामदर्शनं, सुखेनचप्रतिबोधनं, वातमूत्रपुरीषरेतसांमुक्तिः, सर्वाकारैमनोबुद्धीन्द्रियाणांचाव्यापत्तिरिति ॥ (च.वि. 8/89)

The Karya (action) is equilibrium state of Dhatus, its feature is subsidence of disease. Ruk Upashamana (alleviation of disease), Swara Varna Yoga (normalcy of voice and complexion), Sharira Upachaya (development of body), Bala Vruddhi (enhancement of strength), Abhyavaharya Abhilasha (desire for food), Ruchira Ahara Kale (appetite during meal time), Abhyavahrutasya Aharasya Kale Samyaga Jarana (timely and proper digestion of ingested food), Nidra Labho Yathakala (normal sleep at appropriate time), Vaikarina Swapna Darshana (nonappearance of abnormal dreams), Sukhena cha Prati Bodhana (awakening with happiness), Vata Mutra Purusha Retasa Mukti (timely excretion of flatus, urine, faces and semen), Sarva Karai Manobuddhi Indriya (overall feeling of healthy or normal status of mind, intellect and sense organs), thus all considered as Sarva Shubha Lakshana.

IMPORTANCE OF SWASTHAVRITTA

धर्मार्थकाममोक्षाणामारोग्यं मूलमुत्तमम् ।
रोगास्तस्यापहर्तारः श्रेयसो जीवितस्य च ॥
(च.सू. 1/15-16)

Main aim of Ayurveda is to attain Dharma, Artha, Kama and Moksha by health. Ill health takes away the health and happiness from life.

तच्च नित्यं प्रयुञ्जीत स्वास्थ्यं येनानुवर्तते ।
अजातानां विकाराणामनुत्पत्तिकरं च यत् ॥
(च.सू. 5/13)

One should regularly follow diet and regimen, which keep good health and prevent diseases, which are not manifested.

नगरी नगरस्येव रथस्येव रथी यथा ।
स्वशरीरस्य मेधावी कृत्येष्ववहितो भवेत् ॥
(च.सू. 5/103)

Person should perform such actions which are good for his body as the officer in charge of the city and charioteer in charge of the chariot protect city and the chariot respectively.

प्रयोजनं चास्य स्वस्थस्य स्वास्थ्यरक्षणमातुरस्य विकार-प्रशमनं च ॥ (च.सू. 30/26)

Charakacharya emphasizes on the importance of maintenance of health of healthy person and curing the disease of the ill.

सुष्ठुअवतिष्ठतेनीरोगत्वेनेतिस्वस्थः तस्य वृत्तिः स्वस्थरुपतयाऽनुवर्तनं, तत्र स्वस्थवृत्तौ मतमभिमतं पूजितमिति यावत । (चक्रपाणिटिका च.सू. 1/67)

Chakrapani commenting on Swasthavritta mention the condition free from disease is Swastha (Healthy) and regimens followed to keep one self-healthy is Swasthavritta.

न जन्तुः कश्चिदमरः पृथिव्यां जायते क्वचित ।
अतो मृत्युरनिवार्यः स्यात् किन्तु रोगान्निवारयेत ॥
(शा.सं. 1/5/51)

Sharangadhrara Acharya quotes no creature in the universe is immortal, it is impossible to prevent death, but it is possible to prevent disease. So one should try for prevent the disease.

सर्वमन्यत् परित्यज्य शरीरमनुपालयेत् ।
तदभावे हि भावानां सर्वाभावः शरीरिणाम् ॥
(च.नि. 6/7)

Charakacharya further emphasises on the maintenance of health. One should take care of his body by neglecting all other things because if body is not healthy then nothing is existing.

मानवो येन विधिना स्वस्थस्तिष्ठति सर्वदा ।
तमेव कारयेद्वैद्यो यतः स्वास्थ्यं सदेप्सितम ॥
दिनचर्यां निशाचर्यामृतुचर्यां यथोदिताम ।
आचरन्पुरुषः स्वस्थः सदा तिष्ठति नान्यथा ॥
(भा.प्र. 5/12-13)

The methods by which men can remain healthy always should be instructed by physician, since health is always desirable. By following

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Dinacharya, Nishacharya and Rutucharya described for health of mean but not otherwise.

नरोदिनादिचर्याधिर्योनवर्तेतनित्यशः ।
स एवलभतेरोगतनः पथ्यंसमाचरेत ॥
(यो.र. रात्रिचर्या 55)

One who does not follow the Dinacharya and Ratricharya regimens properly as stipulated in Ayurveda, are likely to be infected with multiple health problem. Hence everyone should adhere to these regimens strictly in the interest of his own health.

नरो हिताहारविहारसेवी समीक्ष्यकारी विषयेष्वसक्तः ।
दाता समः सत्यपरः क्षमावानाप्तोपसेवी च भवत्यरोगः ॥
(च.शा. 2/46)

The person, who uses wholesome diet and regimens, enters into action after proper observation, who is unattached to the sensual pleasure, donates, observes equality, truthful, forbearing and devoid to the persons of authority becomes free from diseases.

नित्यं हिताहारविहारसेवी समीक्ष्यकारी विषयेष्वसक्तः ।
दाता समः सत्यपरः क्षमावानाप्तोपसेवी च भवत्यरोगः ॥
(अ.हृ.सू. 4/36)

One who always indulge in Hita Ahara (suitable diet) and Hita Vihara (desirable regimen), is Samikshyakari (reviews pros and cons), indifferent to Vishaya (sensory pleasure), Data (generous), Sama (considers everyone equal), Satyapara (honest), Kshamavana (forgiving in nature), Aptopasevi (keeps company of truthful people) will always be Arogi (not affected by diseases).

Concept of Health and Operational Definition of Health

Health is a dynamic process because it is always changing. We all have times of good health, times of sickness, and maybe even times of serious illness. As our lifestyles change, so does our level of health. Those of us who participate in regular physical activity do so partly to improve the current and future level of our health.

'Health' is a word widely used by us, but its meaning is very often misinterpreted. It is word which has meaning of depth. Health is not perceived in the same way by all the members of community. Traditionally 'health' has been viewed as a condition of absence of disease. As science advanced, various professional people viewed 'health' in their own way.

Health is defined (by WHO) as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. (infirmity = weakness, feebleness, opposite of firmness)

Definitions of health

1. "The condition of being sound in body, mind or spirit especially freedom from physical disease or pain." (Webster)
2. "Soundness of body or mind, that condition in which its functions are duly and efficiently discharged." (oxford English dictionary)
3. "A condition or quality of the human organism expressing the adequate functioning of the organism in given conditions, genetic and environmental."
4. "A modus vivendi enabling imperfect men to achieve a rewarding and not too painful existence while they cope with an imperfect world"
5. "A state of relative equilibrium of body forms and function which results from its successful dynamic adjustment to forces tending to disturb it. It is not passive interplay between body substance and forces impinging upon it but an active response of body forces working toward readjustment." (Perkins)

Importance of Shodhana in Swastha in Relation to Sanchita & Asanchitha Dosha & Classification of Swastha Purusha as Sanchita Dosha and Asanchita Dosha.

Shodhana is a purificatory therapeutic measure in which accumulated morbid Doshas are expelled out from the body through the nearest route. It includes five procedures namely Vamana,

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Virechana, Niruha Basti, Shirovirechana and Raktamokshana. Among these, Vamana, Virechana and Basti are specially indicated for the elimination of Kapha, Pitta and Vata respectively.

Benefits of timely performed Shodhana are improves digestive power, pacifies diseases, maintains homeostasis of the body, improves functions of sense organs, mind, intellect, improves complexion, strength and nourishment, improves quality of progeny, Delays aging and provides long life without affliction of diseases.

Ayurveda explains about the diet and regimen to be followed in a specific season in detail. The unwholesome diet and lifestyles followed in a particular season causes accumulation of Doshas (Sanchaya) in the body. This accumulated Doshas should be eliminated from the body in the next season when they attain the stage of aggravation (Prakopa) and this is called as Rutu Shodhana.

Shodhana Kala in Swastha Purusha -

Always Shodhana should be done in Sadharana Kala, the season when there will not be excessive cold, heat and rain. Pravrut, Sharat and Vasanta are considered as Sadharana Rutus where Basti, Virechana and Vamana should be done respectively. Shodhana is indicated in second month of a particular season and not in the first month, as there will not be severe aggravation of Doshas in the first month and hence can lead to improper elimination of Doshas. Classics clearly explain that during the months which are just prior to Madhava, Nabhasya and Sahasya i.e. during Madhu (Chaitra), Nabha (Shravana) and Saha (Margasheersha) months, one should perform elimination of accumulated Doshas.

Caution to avoid Shodhana in Swastha just like caution to avoid waking up a sleeping poisonous snake makes the rationality behind the performance of Rutushodhana debatable one. But this caution is only applicable for Asanchita Dosha Swastha and not for Sanchita dosha Swastha. Sanchita dosha Swastha is always indicated for Shodhana.

उष्णेन युक्ता रूक्षाद्या वायोः कुर्वन्ति सञ्चयम् ॥
शीतेन कोपमुष्णेन शमं स्निग्धादयो गुणाः ।
(अ.ह.सू. 12/19)

- Vata Chaya- Ushna (hot) + Ruksha (dryness) and other qualities (Laghu, Chala, Vishada, Khara)
- Vata Prakopa- Sheeta (cold) + Ruksha (dryness) and associated qualities
- Vata Shamana- Ushna (hot) + Snigdha (unctuous, oily) other qualities (Guru, Picchila, Sthira)

Chaya	Prakopa	Shamana
Ruksha and other qualities (Laghu, Chala, Vishada, Khara) are associated with Ushna Guna	Ruksha and other associated Shita Guna	Snigdha and other qualities (Guru, Picchila, Sthira) are associated with Ushna Guna

शीतेन युक्तास्तीक्ष्णाद्याश्चयं पित्तस्य कुर्वते ॥
उष्णेन कोपं मन्दाद्याः शमं शीतोपसंहिताः ।
(अ.ह.सू. 12/20)

- Pitta Chaya- Shita (cold) + Tikshna (piercing, strong) etc. qualities (Ruksha, Laghu, Ushna, Drava)
- Pitta Prakopa- Ushna (hot) + Tikshna (piercing, strong) etc qualities.
- Pitta Shamana- Shita (cold) + Manda (mild) and other qualities (Shita, Guru, Snigdha, Picchila, Sthira)

Chaya	Prakopa	Shamana
Tikshna and other qualities (Ruksha, Laghu, Ushna, Drava) are associated with Shita Guna	Tikshna and other associated Ushna Guna	Manda and other qualities (Shita, Guru, Snigdha, Picchila, Sthira) are associated with Shita Guna

शीतेन युक्ताः स्निग्धाद्याः कुर्वते श्लेष्मणश्चयम् ।
उष्णेन कोपं, तेनैव गुणा रूक्षादयः शमम् ॥
(अ.ह.सू. 12/21)

- Kapha Chaya- Shita (Cold) + Snigdha and other qualities (Guru, Picchila, Manda, Shita, Shlakshna, Sandra, Mrudu)
- Kapha Prakopa- Ushna (hot) + Snigdha (unctuous, oily)
- Kpaha Shamana- Ushna (hot) + Ruksha and

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other qualities (Khara, Ruksha, Laghu, Vishada, Chala, Sara)

Chaya	Prakopa	Shamana
Snigdha and other qualities (Guru, Picchila, Manda, Shita, Shlakshna, Sandra, Mrudu) are associated with Shita Guna	Snigdha and other associated Ushna Guna	Ruksha and other qualities (Khara, Ruksha, Laghu, Vishada, Chala, Sara) are associated with Ushna Guna

चीयते लघुरूक्षाभिरोषधीभिः समीरणः ॥
तद्विधस्तद्विधे देहे कालस्यौष्ण्यात्न कुप्यति ।
अद्भिरम्लविपाकाभिरोषधीभिश्च तादृशम् ॥
पित्तं याति चयं कोपं न तु कालस्य शैत्यतः ।
चीयते स्निग्धशीताभिरुदकौषधिभि कफः ॥
तुल्येऽपि काले देहे च स्वकत्नत्वात्न प्रकुप्यति ।
(अ.हृ.सू. 12/25-27)

- Samirana (Vata) undergoes Chaya (mild increase) in Grishma (summer), by the use of plant possessing qualities such as Laghu, Ruksha etc. in the body of person possessing such qualities, but Vata does not undergo Prakopa (increase) because of heat of season.
- Pitta undergoes Chaya (mild increase) in Varsha (rainy), because of food substance that used possess Amla Vipaka, but not Prakopa because of Shita (coldness) of the season.
- Kapha undergoes Chaya (mild increase) by the use of food and water which possess qualities such as Snigdha (oily) and Shita in the season Shishira (winter) and body of person of similar nature but does not undergo Prakopa because of Kapha becomes solidified.

Dimensions of Health -physical, Mental and Social

Health is multi-dimensional. The WHO definition envisages three specific dimensions- the physical, the mental and the social.

Total dimensions are :

1. Physical
2. Mental
3. Social
4. Spiritual
5. Emotional
6. Vocational

1. Physical Dimensions- The physical dimension of health is easiest to understand.

a. The sign of physical health care
b. A good complexion
c. Clean skin
d. Bright eyes
e. Lustrous hairs
f. Body with firm flush
g. Not too fat
h. Sweet breath
i. Good appetite
j. Sound sleep
k. Regular activity of bowel and bladder
l. Smooth easily coordinated bodily movements
m. All organs of normal size and functioning normally
n. Pulse rate, Blood pressure and exercise tolerance within normal ranges

Evaluation of physical health

1. Self-assessment of overall health
2. Inquiry into symptom of ill health risk factors
3. Inquiry into Medication
4. Inquiry into Fitness
5. Inquiry into Medical services
6. Standardized questionnaire for CVD, RD
7. Clinical examination
8. Nutrition & dietary assessment

2. Mental Dimensions- Mental health is not mere absence of mental illness; good health is the ability to respond to many varied experiences of life with flexibility and a sense of purpose. Mental health defined as "a state of balance between the individual and the surrounding world, a state of harmony between oneself and others, coexistence between the realities of self and that of other people and that of environment."

Characteristics of Mentally healthy person:

a. Free from internal conflicts
b. Well adjusted
c. Searches for identity

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d. Strong sense of self-esteem
e. Knows himself, his needs, problems and goals
f. Self-control- the person possess good self-control, not dominated by anger, fear and jealously, worries etc. he is able to solve problem when confronted with.
g. Coping with stress and anxiety

3. Social Dimension -Quantity and quality of an individual's interpersonal ties and the extent of involvement with the community. Social wellbeing implies harmony and integrates.

a. within the individual,
b. between each individual and other member of society
c. between individual and world in which they live

Characteristics of social health

a. Possession of social skills, social functioning
b. Ability to see oneself as a member of community
c. Focuses on social and economic conditions

4. Spiritual Dimension- it is not at a religious concept it is a concept by which it exposes man to integrity, principles, ethics and helps to lead him a life with a purpose which elevate him to the higher planes of thought.

5. Emotional Dimension- emotional as are feeling or forces that emerge suddenly in the mind, so emotional dimension includes his emotion, felling and ability to control them during various situations of life.

6. Vocational Dimension-this dimension is concerned with the occupation. Occupations play an important role in promoting both physical and mental health. When work is fully adapted to human goals, capacities and limitations matches exactly to his occupation, the person is vocationally healthy if not the individual feels unhappy and frustrated.

Positive Health - It is a state of physical, mental, social and spiritual wellbeing, when a person enjoys an equilibrium state with his environment. It is an important component of improving the quality of life. It implies the ability to lead a socially and economically productive life.

Factors favouring positive health-

a. Proper genetic endowment
b. Proper nutrition
c. Conducive physical, biological and psycho-social environment
d. Good socio-economic status
e. Proper education including knowledge of healthful ways of living.
f. Promotive, preventive and restorative health services.

Concept of Well-being: Objective Component of Well-being - Standard of Living and Level of Living and Subjective Component of Well-being - Quality of Life

Wellness further describes health status. It allows health to be placed on a continuum from one's optimal level ("wellness") to a maladaptive state ("illness"). Wellness is a dynamic process that is ever changing. The well person usually has some degree of illness and the ill person usually has some degree of wellness.

The classic description of wellness was developed by Dunn in the early 1960s. According to Dunn (1961), high-level wellness means functioning to one's maximum health potential while remaining in balance with the environment.

Well-Being- The well-being of an individual has two components objective and subjective.

Objective Components: Standard of Living and Level of Living

Subjective Component: Quality of Life

Standard of living: Standard of Living Refers to Expenditure, Goods we Consume, Services we enjoy.

Definition- "Income and Occupation, standards of housing, sanitation, nutrition, level of provision of health, educational, recreational and other services may all be used individually as measures of socio - economic status - collectively as an index called "Standard of Living"

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d. Strong sense of self-esteem
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Level of Living: Health, Food Consumption, Education, Occupation & Working Conditions, Housing, Social Security, Clothing, Recreation & Leisure, Human Rights etc.

Quality of Life: Quality of Life Subjective component

Definition- "the condition of life resulting from the combination of the effects of the complete range of factors such as those determining health, happiness, education, social and intellectual attainments, freedom of action, justice and freedom of expression"

Physical Quality of Life Index: Various attempts have been made to reach one composite indicator from a number of the indicators. The Physical Quality of Life Index (PQLI) is one such index

1. Infant Mortality
2. Life Expectancy at age one.
3. Literacy

PQLI: does not measure economic growth, Measures social, economic & political policies.

Human Development Index

1. Longevity (life expectancy at Birth)
2. Knowledge (adult literacy rate and mean years of schooling)
3. Income (real GDP per capita in purchasing power - parity Dollars) etc.

One Health Concept / Vasudhaiva Kutumbakam or "one Earth- One Family- One Future"

Vasudhaiva Kutumbakam is a Sanskrit phrase that has been in use for centuries in Indian philosophy and spirituality. It is believed to have originated in ancient Indian scriptures such as the Mahabharata and the Upanishads, which emphasise the idea of universal brotherhood and the interconnectedness of all beings. The phrase became more widely known in the modern era due to its use in Indian literature, music, and art.

Over time, Vasudhaiva Kutumbakam has come to be seen as a symbol of India's cultural and spiritual heritage, embodying the values of compassion, respect for diversity, and a commitment to promoting peace and unity in the world. In recent years, the concept has gained greater recognition and popularity, with many organisations, governments, and individuals embracing the philosophy as a way of promoting global cooperation and understanding.

Vasudhaiva Kutumbakam is a timeless principle that has been a part of India's cultural and spiritual heritage for centuries. Its message of universal brotherhood and the interconnectedness of all beings remains as relevant today as it was in the past, and continues to inspire individuals and organisations to work towards creating a better, more harmonious world for all.

Inculcating the Philosophy

Vasudhaiva Kutumbakam is a Sanskrit phrase that means "the world is one family". This is how we can inculcate the philosophy of Vasudhaiva Kutumbakam,

Embrace diversity - Accept and celebrate differences in people, cultures, and beliefs.

Practice empathy - Try to understand other people's perspectives and feelings.

Promote kindness - Spread love and positivity, and help others in need.

Lead by example- Show through your actions that you believe in the unity of all humanity.

Educate People- Share your knowledge and beliefs about the interconnectedness of all people and encourage others to do the same.

By incorporating these principles into your daily life, you can help to create a world that values and respects diversity, and where everyone feels a sense of belonging and connection to each other.

Relevance of Vasudhaiva Kutumbakam- The philosophy of Vasudhaiva Kutumbakam is highly relevant today as it emphasises the idea of unity and connectedness among all human beings, regardless of their race, religion, or nationality.

Promotes peace- By recognizing that all people

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are part of one global family, it encourages a sense of empathy and compassion, which can lead to greater peace and cooperation.

Encourages respect for diversity- By embracing diversity, the philosophy promotes mutual respect and understanding, which can help to reduce conflicts and promote harmony.

Fosters global responsibility -By recognizing that the actions of one person can impact the entire world, the philosophy encourages a sense of global responsibility and encourages individuals to take actions that benefit not just themselves, but also others.

Supports sustainability- By promoting the idea that all people are interconnected and that the well-being of one person is linked to the well-being of others, the philosophy supports sustainability and encourages the protection of the planet for future generations.

The philosophy of Vasudhaiva Kutumbakam promotes unity, respect, and responsibility, and has the potential to make a positive impact on the world by promoting peace, understanding, and sustainability.

MCQ on Swastha and Swasthya

1. Definition of health given by WHO not includes which of the following dimensions:
   (a) Social (b) Physical
   (c) Mental (d) Emotional
2. Standard of Living (WHO) includes all except:
   (a) Income
   (b) Sanitation and nutrition
   (c) Level of provision of health
   (d) Human rights
3. Living standard of people is best assessed by:
   (a) Infant mortality rate
   (b) Maternal mortality
   (c) Physical quality of life index
   (d) Death rate
4. Human living standards can be compared in different countries by
   (a) HDI (b) PQLI
   (c) HPI (d) DALY
5. Human Development Index (HDI) does not include:
   (a) Mean years of schooling
   (b) Life expectancy at age 1
   (c) Real GDP per capita
   (d) Adult literacy rate
6. All of the following indicators are included in Physical Quality of Life Index (PQLI) except:
   (a) Infant mortality rate
   (b) Life expectancy at age one
   (c) Literacy rate
   (d) Per capita income
7. The Physical Quality of the Life Index considers
   I. Expectancy of life at birth
   II. Expectancy of life at age one
   III. Infant mortality rate
   IV. Literacy rate
   Of these components:
   (a) I alone is correct
   (b) I, III and IV are correct
   (c) I, II and III are correct
   (d) II, III and IV are correct
8. Minimum and Maximum Values established for calculation of Life Expectancy index in HDI are:
   (a) 0 years and 65 years
   (b) 0 years and 85 years
   (c) 25 years and 85 years
   (d) 0 years and 100 years
9. Human Development Index (HDI) values range between:
   (a) -1 to +1 (b) 0 to 1
   (c) 0 to 3 (d) 1 to 3
10. PQLI stands for:
    (a) Physical quality of life index
    (b) Physical quantity of life index
    (c) Physiological quality of life index
    (d) Psychological quality of life index

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11. All of the following are determinants for the essential components to calculate Physical Quality of Index (PQLI) except:
(a) Infant mortality rate
(b) Life expectancy at age one year
(c) Basic literacy rate in population
(d) Life expectancy at birth

12. Human Development index includes:
(a) Infant mortality rate
(b) Life expectancy at birth
(c) Net reproduction rate
(d) No. of years of disability

13. PQLI included are:
(a) Literacy (b) Mortality
(c) Income
(d) Life expectancy at birth

14. All of the following represent Specific protection mode of Disease prevention Except:
(a) Chemoprophylaxis for meningococcal meningitis
(b) Personal hygiene and Environmental sanitation
(c) Usage of condoms
(d) Iodisation of salt

15. Secondary level of prevention include all of the following except:
(a) Health screening for Diabetes Mellitus
(b) Case finding for Falciparum Malaria
(c) Contact tracing for STIs
(d) Reconstructive Surgery in Leprosy

16. In a population to prevent coronary artery disease changing harmful lifestyles by education is referred to as:
(a) High risk strategy
(b) Primary prevention
(c) Secondary prevention
(d) Tertiary prevention

17. In an area with fluoride rich water, the defluoridation of water is which level of prevention?
(a) Primary (b) Secondary
(c) Tertiary (d) Primordial

18. Which of the following is an example of Disability limitation in poliomyelitis?
(a) Reducing occurrence of polio by immunization
(b) Arranging for schooling of child suffering from PRPP
(c) Resting affected limbs in neutral position
(d) Providing calipers for walking

19. Which of the following is primordial prevention?
(a) Action taken prior to the onset of disease
(b) Prevention of emergence of development of risk factors
(c) Action taken to remove the possibility that a disease will ever occur
(d) Action that halts the progress of a disease

20. 'Disability Limitation' is mode of intervention for:
(a) Primordial Prevention
(b) Primary Prevention
(c) Secondary Prevention
(d) Tertiary Prevention

21. Which of the following is the most logical sequence?
(a) Impairment-Disease-Disability-Handicap
(b) Disease-Impairment-Disability-Handicap
(c) Disease-Impairment- Handicap-Disability
(d) Disease-Handicap-Impairment-Disability

22. Pap smear test for detection of carcinoma of cervix is which level of prevention?
(a) Primordial (b) Primary
(c) Secondary (d) Tertiary

23. A person who has lost his foot in an accident and is not able to walk is an example of:
(a) Disease (b) Disability
(c) Impairment (d) Handicap

24. Primary prevention of obesity:
(a) Low fiber diet
(b) High fiber diet
(c) High cholesterol diet
(d) High intake of protein

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25. Primordial prevention in coronary heart disease:
    (a) Exercise in high risk area
    (b) BP monitoring (c) Salt restriction
    (d) Statins (e) TMT
26. Primary prevention of dental carries are:
    (a) Dental screening
    (b) Health education
    (c) Defluoridation of water
    (d) Dental filling
    (e) Tooth extraction
27. Primary prevention:
    (a) Marriage counseling
    (b) Early diagnosis and treatment
    (c) Pap smear
    (d) Self breast examination
28. Vitamin A prophylaxis to a child is:
    (a) Health promotion
    (b) Specific protection
    (c) Primordial prevention
    (d) Secondary prevention
29. Screening of the diseases is which type of prevention?
    (a) Primordial (b) Primary
    (c) Secondary (d) Tertiary
30. Which of the following is not a primary prevention strategy?
    (a) Breast self examination
    (b) Control of tobacco
    (c) Radiation protection
    (d) Cancer education
31. Prevention of emergence of risk factor is
    (a) Primordial prevention
    (b) Primary prevention
    (c) Secondary prevention
    (d) Tertiary prevention
32. Immunization is
    (a) Primary prevention
    (b) Secondary prevention
    (c) Tertiary prevention
    (d) Disability limitation
33. Iodized salt in iodine deficiency control programme is
    (a) Primary prevention
    (b) Secondary prevention
    (c) Tertiary prevention
    (d) Primordial prevention
34. Target group in Secondary prevention
    (a) Healthy individuals
    (b) Patients
    (c) Animals
    (d) Children
35. School health checkup comes under... level of prevention
    (a) Primordial (b) Primary
    (c) Secondary (d) Tertiary
36. Childhood obesity prevention is a type of
    (a) Primordial prevention
    (b) Primary prevention
    (c) Secondary prevention
    (d) Tertiary prevention
37. Monitoring of blood pressure which type of prevention
    (a) Primordial (b) Primary
    (c) Secondary (d) Tertiary
38. All of the following comes under primary prevention except:
    (a) Pap smear (b) Helmets
    (c) Contraception (d) Vaccines
39. Which one of the following is primary prevention:
    (a) Active treatment (b) Vaccination
    (c) Screening (d) Rehabilitation
40. Prevention of emergence of risk factor is:
    (a) Primordial prevention
    (b) Primary prevention
    (c) Secondary prevention
    (d) Tertiary prevention
41. Iodine salt supplementation is:
    (a) Specific protection
    (b) Primordial prevention
    (c) Decrease the deformity
    (d) Secondary prevention

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42. All are health promotion strategies Except:
(a) Insecticides spray
(b) Potable safe water supply
(c) Life style modification
(d) Chemoprophylaxis

43. One of the following is an example for Tertiary prevention:
(a) Vaccination
(b) Immediate diagnosis and treatment
(c) Rehabilitation
(d) Health education

44. Which is not included in primary prevention:
(a) Health education
(b) Life-style modification
(c) Immunization
(d) Nutritional supplementation

45. Health promotion includes all except:
(a) Specific protection
(b) Health education
(c) Food fortification
(d) Environment modification

46. Primary prevention among following is:
(a) Disability limitation
(b) Early diagnosis
(c) Treatment
(d) Immunization

47. Which of the following is a primary prevention in polio:
(a) Good sanitary measures
(b) Rehabilitation
(c) Provision of 3 doses of OPV in early infancy
(d) Collection of stool sample for diagnosis

Answers of MCQ on Swastha and Swasthya

1. Ans.(d) Emotional
2. Ans.(d) Human rights
3. Ans. (c) Physical quality of life index
4. Ans. (a) HDI
5. Ans. (b) Life expectancy at age 1
6. Ans. (d) Per capita income
7. Ans. (d) II, III and IV are correct
8. Ans. (c) 25 years and 85 years
9. Ans. (b) 0 to 1
10. Ans. (a) Physical quality of life index
11. Ans. (d) Life expectancy at birth
12. Ans. (b) Life expectancy at birth
13. Ans. (a) Literacy
14. Ans. (b) Personal hygiene and Environmental sanitation
15. Ans. (d) Reconstructive Surgery in Leprosy
16. Ans. (b) Primary prevention
17. Ans. (a) Primary
18. Ans. (c) Resting affected limbs in neutral position
19. Ans. (b) Prevention of emergence of development of risk factors
20. Ans.(d) Tertiary Prevention
21. Ans. (b) Disease-Impairment-Disability-Handicap
22. Ans. (c) Secondary
23. Ans. (b) Disability
24. Ans. (b) High fiber diet
25. Ans. (c) Salt restriction
26. Ans. (b) Health education
27. Ans. (a) Marriage counselling
28. Ans. (b) Specific protection
29. Ans. (c) Secondary
30. Ans. (a) Breast self examination
31. Ans. (a) Primordial prevention
32. Ans. (a) Primary prevention
33. Ans. (a) Primary prevention
34. Ans. (b) Patients
35. Ans. (c) Secondary
36. Ans. (a) Primordial prevention
37. Ans. (c) Secondary
38. Ans. (a) Pap smear
39. Ans. (b) Vaccination
40. Ans. (a) Primordial prevention
41. Ans. (a) Specific protection
42. Ans. (d) Chemoprophylaxis
43. Ans. (c) Rehabilitation
44. Ans. (b) Life-style modification
45. Ans. (a) Specific protection
46. Ans. (d) Immunization
47. Ans. (c) Provision of 3 doses of OPV in early infancy

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Chapter 2 Healthy Life Style-Dinacharya (Daily Regimen)

Syllabus

Concept of Primordial, Primary, Secondary and Tertiary Prevention along with examples in Ayurveda. Importance of Ahara and Vihara as the health promotive and disease preventive measures. Importance of Niyata kala vihara (Dinacharya, Ritucharya) and Aniyata Kala Vihara (Vegadharana, Vegaudirana, Ritushodhana, Brumhana and Bhutadi asparshana) for health promotion and disease prevention.

Learning objectives

1. Explain the Primordial, Primary, Secondary, and Tertiary Preventive measures in the context of Ayurveda with examples.
2. Explain the importance of Ahara and Vihara as the health promotive and disease preventive measures.
3. Describe the importance of Niyata kala vihara (Dinacharya, Ritucharya) and Aniyata kala Vihara (Vegadharana, Vegaudirana, Ritushodhana, Brumhana and Bhutadi asparshanaa) for health promotion and disease prevention.

Syllabus- Healthy Life style -Dinacharya (Daily regimen)

Total - 13 hours (Lecture: 08 hour, Non-lecture: 05 hours)

MCQ- Yes- SAQ (5 Marks)- Yes- LAQ (10 Marks)- Yes

Concept of Primordial, Primary, Secondary and Tertiary Prevention Along with Examples in Ayurveda. Importance of Ahara and Vihara as the Health Promotive and Disease Preventive Measures.

The goals of medicine are to promote health, to preserve health, to restore health when it is impaired, and to minimize suffering and distress. These goals are embodied in the word "prevention". Successful prevention depends upon a knowledge of causation, dynamics of transmission, identification of risk factors and risk groups, availability of prophylactic or early detection and treatment measures, an organization for applying these measures to appropriate persons or groups, and continuous evaluation of and development of procedures applied.

The concepts of prevention as enunciated by Leavell and Clark have stood the test of time. The basic framework worked out by them has practical utility even today. The four phases of prevention are:

1. Primordial Prevention
2. Primary prevention
3. Secondary prevention
4. Tertiary prevention.

These phases are further categorized into five levels of prevention as follows:

1. Health promotion
2. Specific protection
3. Early diagnosis and treatment
4. Disability limitation
5. Rehabilitation

Primordial Prevention

It has come from a Latin word 'primordium' means beginning. It means prevention at a stage, when the risk factors have not yet developed.

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Primordial prevention is aimed to eliminate the development of risk factors, while primary prevention is aimed to reduce the risk of exposure. Primordial prevention is achieved by health education. Example being, information is imparted to school children for adopting and maintaining healthy lifestyles.

Example- Primordial prevention is the prevention of emergence of risk factors in population groups that have not yet Appeared In this stage, the disease can be prevented by giving proper health education about the do's and do not's for the disease. Encouraging the people from adopting healthful lifestyle and habits the concept of Sadvritta, Achara Rasayana can be taken under this level of prevention. As no action is taken in this level of prevention, the main mode of intervention in this level is to give proper education about the prevention modalities of disease to the mass as well as individual and encourage to adopt healthy habits in the family and community.

Primary Prevention

Primary prevention can be defined as "action taken prior to the onset of disease, which removes the possibility that a disease will ever occur". It signifies intervention in the pre-pathogenesis phase of a disease or health problem (e.g., low birth weight) or other departure from health. Primary prevention may be accomplished by measures designed to promote general health and well-being, and quality of life of people or by specific protective measures.

Primary prevention is far more than averting the occurrence of a disease and prolonging life. It includes the concept of "positive health", a concept that encourages achievement and maintenance of "an acceptable level of health that will enable every individual to lead a socially and economically productive life". It concerns an individual's attitude towards life and health and the initiative he takes about positive and responsible measures for himself, his family and his community.

The concept of primary prevention is now being applied to the prevention of chronic diseases such as coronary heart disease, hypertension and cancer based on elimination or modification of "risk-factors" of disease.

1. Population (mass) strategy- Another preventive approach is "population strategy" which is directed at the whole population irrespective of individual risk levels. For example, studies have shown that even a small reduction in the average blood pressure or serum cholesterol of a population would produce a large reduction in the incidence of cardiovascular disease.

2. High-risk strategy- The high-risk strategy aims to bring preventive care to individuals at special risk. This requires detection of individuals at high risk by the optimum use of clinical methods.

Primary prevention is a desirable goal. It is worthwhile to recall the fact that the industrialized countries succeeded in eliminating a number of communicable diseases like cholera, typhoid and dysentery and controlling several others like plague, leprosy and tuberculosis, not by medical interventions but mainly by raising the standard of living (primary prevention). And much of this success came even before immunization became universal routine. The application of primary prevention to the prevention of chronic disease is a recent development. To have an impact on the population, all the above three approaches (primordial prevention, population strategy and high-risk strategy) should be implemented as they are usually complementary.

Primary prevention is a "holistic" approach. It relies on measures designed to promote health or to protect against specific disease "agents" and hazards in the environment. It utilizes knowledge of the pre-pathogenesis phase of disease, embracing the agent, host and environment. Fundamental public health measures and activities such as sanitation; infection control; immunization; protection of food, milk, and water supplies; environmental protection; and protection against occupational hazards and accidents are all basic to primary prevention. Basic personal hygiene and public health measures have had a major impact

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on halting communicable disease epidemics. Immunization, infection control (eg, hand washing), refrigeration of foods, garbage collection, solid and liquid waste management, water supply protection and treatment, and general sanitation have reduced infectious disease threats to populations. The safety and low cost of primary prevention justifies its wider application. Primary prevention has become increasingly identified with "health education" and the concept of individual and community responsibility for health.

Example- Primary prevention is described as "action taken prior to the onset of disease, which removes the possibility that a disease will ever occur" It signifies the intervention at the pre-pathogenesis phase of the disease. The main prevention modality for any disease is Nidana Parivarjana (avoidance of causative factors) in Ayurveda. In Amlapitta one should avoid excessive intake of Amla-Ushna Ahara, Madya (alcoholic beverages), Abhisyandi Pistanna Sevana, doing Adhyashana, Viruddahasana, intaking food during Ajirna, excessive Sevana of Kulattha, Vegadharana, junk food, etc.

Follow the Pathya (Ahara and Vihara) depending on disease- In Amlapitta wholesome diet barley, wheat, green gram, old rice, warm water, sugar candy, inflorescence of the plantain, cucumber, matured ash gourd, pomegranate, gooseberry, dry grapes, etc. should be taken. And the Apathy like Tila, Masha, Kulattha, milk of goat, Dhanyamla, etc. should be avoided. Similarly, one can practice Yogasana, Pranayama, Yogic Kriya, Dhyana and Mudra. These measures improve the well beings and happiness of an individual, also improves all the dimensions of health so that an individual can enjoy positive health.

Secondary Prevention

Secondary prevention can be defined as "action which halts the progress of a disease at its incipient stage and prevents complications". The specific interventions are early diagnosis {e.g., screening tests, case finding programmes) and adequate treatment. By early diagnosis and adequate treatment, secondary prevention attempts to arrest the disease process; restore health by seeking out unrecognized disease and treating it before irreversible pathological changes have taken place; and reverse communicability of infectious diseases. It may also protect others in the community from acquiring the infection and thus provide, at once, secondary prevention for the infected individuals and primary prevention for their potential contacts.

Early diagnosis and prompt treatment offers benefits to the affected individuals as well as to their families and the community. It helps to reduce the transmission of infection and, hence, is considered as a method of prevention. As a preventive strategy, it is most useful for diseases with long incubation period or long latent period since sufficient time is available to prevent further progression of disease and to improve further progression of disease and to improve prognosis. In non-communicable diseases, sufficient lead time should be available.

Example- The term "secondary prevention" refers to measures taken to stop a disease in its early stages and avoid consequences. The disease has already entered the body at this point. In general, Nidana Parivarjana, Samshodhana Chikitsa, and Samshamana Chikitsa are used to treat all diseases. Along with follow the diet, uses of single drugs, Yogasana, Surya Namskara, Pranayama, Yogic Kriya are most effective for in secondary prevention.

Tertiary Prevention

Tertiary prevention can be defined as "all measures available to reduce or limit impairments and disabilities, minimize suffering caused by existing departures from good health and to promote the patient's adjustment to irremediable conditions"

For example, treatment, even if undertaken late in the natural history of disease may prevent sequelae and limit disability. When defect and disability are more or less stabilized, rehabilitation may play a preventable role. Modern rehabilitation includes psychosocial, vocational, and medical

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components based on team work from a variety of professions. Tertiary prevention extends the concept of prevention into fields of rehabilitation.

Tertiary prevention acts at the stage where disease has got established in the individual. It is a costly venture, though recent efforts at community-based rehabilitation have tried to bring down the costs. Tertiary prevention can be applied at the last two levels of prevention. These are:

Disability limitation: Here the disease has progressed significantly and has caused some loss of function of a temporary or permanent nature. The idea is to provide relief to the affected individual so that a total handicap can be prevented. This mode of prevention can be illustrated by the example of leprosy. Leprosy can lead to irreversible ocular damage and blindness when left untreated. If multidrug therapy is instituted even after some ocular damage has occurred, total blindness can still be prevented.

Rehabilitation: Rehabilitation can be considered as a preventive measure in that if effectively utilized, it can prevent further social drift of the affected individual. Social drifts the phenomenon of going down the social ladder due to loss of ability to generate income caused by disease.

Rehabilitation is an extremely costly venture. The aim of rehabilitation is to integrate the affected individual in the community by optimizing his functional ability. It involves psychological, vocational and social and educational intervention.

Example- When the disease process has advanced beyond its early stages it is still possible to accomplish prevention by what might be called as tertiary prevention. If the disease is not managed in its early stage, it will become Yapya and complications occurs. Strict adherence with food habits, proper diet, healthy lifestyle and regimen along with medication mostly gives total cure form Amlapitta (acid peptic disorder). If not treated timely or if unwholesome diet, regimen and habits continued, it may lead to ulcer, anaemia and various health problems like chronic gastritis, duodenitis, IBS, malabsorption, peptic stenosis.

Health promotion- Health promotion is "the process of enabling people to increase control over, and to improve health". It is not directed against any particular disease, but is intended to strengthen the host through a variety of approaches (interventions). The well-known interventions in this area are:

1. Health education- This is one of the most cost-effective interventions. A large number of diseases could be prevented with little or no medical intervention if people were adequately informed about them and if they were encouraged to take necessary precautions in time. The targets for educational efforts may include the general public, patients, priority groups, health providers, community leaders and decision-makers.

2. Environmental modifications- A comprehensive approach to health promotion requires environmental modifications, such as provision of safe water; installation of sanitary latrines; control of insects and rodents; improvement of housing, etc. The history of medicine has shown that many infectious diseases have been successfully controlled in western countries through environmental modifications, even prior to the development of specific vaccines or chemotherapeutic drugs. Environmental interventions are non-clinical and do not involve the physician.

3. Nutritional interventions- These comprise food distribution and nutrition improvement of vulnerable groups; child feeding programmes; food fortification; nutrition education, etc.

4. Lifestyle and behavioural changes- The conventional public health measures or interventions have not been successful in making inroads into lifestyle reforms. The action of prevention in this case, is one of individual and community responsibility for health, the physician and in fact each health worker acting as an educator than a therapist. Health education is a basic element of all health activity. It is of paramount importance in changing the views, behaviour and habits of people.

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2. Specific protection : To avoid disease altogether is the ideal but this is possible only in a limited number of cases. The following are some of the currently available interventions aimed at specific protection: (a) immunization (b) use of specific nutrients (c) chemoprophylaxis (d) protection against occupational hazards (e) protection against accidents (f) protection from carcinogens (g) avoidance of allergens (h) the control of specific hazards in the general environment, e.g., air pollution, noise control (i) control of consumer product quality and safety of foods, drugs, cosmetics, etc.

3. Early diagnosis and treatment- Early detection and treatment are the main interventions of disease control. The earlier a disease is diagnosed and treated the better it is from the point of view of prognosis and preventing the occurrence of further cases (secondary cases) or any long-term disability. It is like stamping out the "spark" rather than calling the fire brigade to put out the fire.

Early diagnosis and treatment though not as effective and economical as "primary prevention" may be critically important in reducing the high morbidity and mortality in certain diseases such as essential hypertension, cancer cervix and breast cancer. For many others such as tuberculosis, leprosy and STD, early diagnosis and treatment are the only effective mode of intervention. Early effective therapy has made it possible to shorten considerably the period of communicability and reduce the mortality from acute communicable diseases.

4. Disability limitation- When a patient reports late in the pathogenesis phase, the mode of intervention is disability limitation. The objective of this intervention is to prevent or halt the transition of the disease process from impairment to handicap.

i. Impairment: An impairment is defined as "any loss or abnormality of psychological, physiological or anatomical structure or function", e.g., loss of foot, defective vision or mental retardation. An impairment may be visible or invisible, temporary or permanent, progressive or regressive. Further, one impairment may lead to the development of "secondary" impairments as in the case of leprosy where damage to nerves (primary impairment) may lead to plantar ulcers (secondary impairment).

ii. Disability: Because of an impairment, the affected person may be unable to carry out certain activities considered normal for his age, sex, etc. This inability to carry out certain activities is termed "disability". A disability has been defined as "any restriction or lack of ability to perform an activity in the manner or within the range considered normal for a human being".

iii. Handicap: As a result of disability, the person experiences certain disadvantages in life and is not able to discharge the obligations required of him and play the role expected of him in the society. This is termed "handicap", and is defined as "a disadvantage for a given individual, resulting from an impairment or a disability, that limits or prevents the fulfilment of a role that is normal (depending on age, sex, and social and cultural factors) for that individual".

Rehabilitation- Rehabilitation has been defined as "the combined and coordinated use of medical, social, educational and vocational measures for training and retraining the individual to the highest possible level of functional ability". It includes all measures aimed at reducing the impact of disabling and handicapping conditions and at enabling the disabled and handicapped to achieve social integration. Social integration has been defined as the active participation of disabled and handicapped people in the mainstream of community life. Rehabilitation medicine has emerged in recent years as a medical speciality. It involves disciplines such as physical medicine or physiotherapy, occupational therapy, speech therapy, audiology, psychology, education, social work, vocational guidance and placement services. Examples of rehabilitation are- establishing schools for the blind, provision of aids for the crippled, reconstructive surgery in leprosy, muscle re-education and graded exercises in neurological disorders, change of profession for a more suitable

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one and modification of life in general in the case of tuberculosis, cardiac patients and others. The purpose of rehabilitation is to make productive people out of nonproductive people.

Importance of Niyata Kala Vihara (DInacharya, Ritucharya) and Aniyata Kala Vihara (vegadharana, Vegaudirana, Ritushodhana, Brumhana and Bhutadi Asparshana) for Health Promotion and Disease Prevention

The words "lifestyle" can be used to define the ideas of "Vihara," "Ahara Vidhi," and "Achara" as they are referred to in the classics of ayurveda. Arunadatta divides Vihara into Niyata kala (regular) and Aniyata kala (according to specific condition) categories.

ăNiyata Kala Vihara- Dinacharya and Rutucharya.

ăAniyata Kala Vihara - comprises Vihara according to Avastha (condition); this can be interpreted as Vyadhiavastha.

Ahara Vidhi includes Ahara Vidhi Vidhana (rules of diet) and Bhojanottara Vidhi (conducts after meal); Achara includes Sadvritta (good conducts). Vihara includes the conducts by a person in daily or seasonal routine. This includes Abhyanga (oil application to the body), Vyayama (exercise), Nidra (sleep), Vega dharana (suppression of natural urges), Vyavaya (sexual intercourse), Chankramana (walking), Adhva (brisk walking), Atapa sevana (exposure to sunlight), Asana (sitting), Snana (bathing), Pravatasevana (exposure to strong wind) etc. Amongst them Acharyas have quoted their importance and usefulness or harmfulness according to the specific condition e.g. Ardhashaktya Vyayama (exercise upto half of the capacity) with prior Abhyanga (oil application) is useful in Hemanta Rutu (winter) and strong individuals but excess Vyayama is harmful in Grishma Rutu (summer) and weak individuals. Also, Divaswapna (daytime sleep) is useful in Grishma Rutu and Karshya (emaciated person) while harmful in Vasanta Rutu (autumn) and Sthoulya (obese person).

Acharya Sushruta has given limit of Divaswapna as 1 muhurta i.e. 48 min. Ratrai jagarana (vigil at night) is contraindicated always by Acharyas for maintenance of health. About Snana (bathing), Acharyas have strictly contraindicated it in the condition of Ajirna (indigestion), Atisara (diarrhoea) etc.

Vegadharana (suppression of natural urges) of Mala (faeces), Mutra (urination) etc. has always been contraindicated because of their harmful effect in the body.

About Ahara Vidhi, Acharyas have advised to take Ushna (luke-warm) and Snigdha (unctuous) food in proper quantity and proper time with full concentration to get easily digested. If one takes cold food, it slows down the process of digestion. Unctuous food helps for easy passage of food.

To decide the ideal quantity of food, Acharyas have given the symptoms which are produced in the body after taking food in such a quantity which is suitable for him which varies individually. About the proper time for intake of food, Acharyas have advised to take lunch during 2nd Yama (i.e. between 3-6 hrs after sunrise) and dinner should be taken at the end of first Prahara of night (i.e. within 3 hrs after sunset).

It has also been advised to take food as suitable to his prakriti (constitution), age, habitat etc. About Ahara Sevana krama i.e. sequence of intake of food items, it has been stated by Acharyas that food items having Madhura rasa (sweet) should be consumed first because it is difficult to digest. It gets more in contact with digestive enzymes when consumed first.

About Bhojanottara Vihara, Acharya Sushruta has advised Rajavat asana (sitting in comfortable position), Shatapada Gamana (walking about hundred feet i.e. for a while), Vamaparshwa shayana (lying down in left lateral position), Manonukula Shabda, Sparsha, Rupa, Gandha Sevana (to indulge in sound, sight, taste smell and touch which are pleasing to the mind).

1. Dinacharya and Rutucharya promoting health and preventing diseases.
2. Rutu Shodhana is a preventive management for Nijaroga, which resets the human

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physiology. Rutu Shodhana is one of the best methods to prevent lifestyle disorders.

3. According to the Ayurvedic texts, there is one main cause of all type of diseases and that is the suppression of natural Vega. Therefore, it should not to be suppressed.

Syllabus- Concept of waking up at 'brahme muhurta' in the present scenario and the effect of early rise on health, sleep, alertness and memory. 'Usha Jalapana' (Drinking water in early morning). Importance of Malatyaga in Vata Kala - early morning (Good Bowel Habits.). Mukhapraikshalana and face washes used currently.

Learning objectives-

1. Explore and analyse the concept of waking up at 'Brahma muhurta' in the present scenario and the effect of early rise on health, sleep, alertness and memory.
2. Describe the time, quantity and benefits of 'Usha Jalapana' (Drinking water in early morning).
3. Explain the Importance of Malatyaga in vata kaala – early morning (Good Bowel Habits)
4. Explain the procedure, dravyas and benefits of Mukhaprakshalana and face washes used currently.

Dinacharya

Dinacharya is composed of two words Dina and Charya.

Dina means a day or day time or day today.

Charya means regimens, duties, action to be carried.

दिने दिने चर्य दिन चर्या, दिनस्य वा चर्या दिनचर्या ।
(सर्वांग सुन्दर टिका अ.ह.सू. 2/1)

प्रतिदिनं कर्त्तव्या चर्या दिनचर्या ।
(शशिलेखा टिका अ. स. सू. 3/1)

Arunadattta in his commentary explaines regimens done daily called as Dinacharya.

मानवो येन विधिना स्वस्थस्तिष्ठति सर्वदा ।
तमेव कारचेद्वैद्यो यतः स्वास्थ्यं सदेप्सितम् ॥
दिनचर्यां निशाचर्यामृतुचर्यां यथोदिताम ।
आचरन्पुरुषः स्वस्थः सदा तिष्ठति नान्यथा ॥
(भा.प्र. 5/12-13)

The methods by which men can remain healthy always should be instructed by physician, since health is always desirable. By following Dinacharya, Nishacharya and Rutucharya described for health of mean but not otherwise.

Aim and importance of Dinacharya

Aim :

a. Maintenance the normal health.
b. Increased life span without any diseases.

Importance :

a. Regimens done daily to maintenances normal health.
b. Maintenance of hygiene (Shoucha) and keeps the body cleans etc.
c. Desire for the intake of food, proper and easy digestion of the ingested food.
d. Prolong the life and longevity.
e. Keeps the mind calm and quiet and helps in meditation
f. Helps in increases the strength of Indriyas.
g. Helps in increase the strength of body.
h. Prevents all the diseases.

Brahma Muhurta (Getting up in the morning)

(Reference- A. Hr.su. 2/1, A. S. Su 3/2, Bha. Pra. P. 5. Y. R. Dinacharya Adhyaya)

ब्राह्मे मुहूर्त उत्तिष्ठेत्स्वस्थो रक्षार्थमायुषः ।
(अ.ह.सू. 2/1)

One desirous of long healthy life should get up in Brahma Muhurta or around 45 minutes before sun rise, around 5 – 6 am. After considering the position of digestion or indigestion (food taken previous night). Last three hours of the night from 3 am to 6 am is known as Brahma Muhurta.

ब्राह्मे मुहूर्ते बुध्येत स्वस्थो रक्षार्थमायुषः ।
तत्र सर्वांघशान्त्यर्थं स्मरेच्च मधुसूदनम् ॥
(भा.प्र. 5 यो.र.)

ब्राह्मे मुहूर्ते उत्तिष्ठेज्जीर्णाजीर्ण निरुपयन ।
रक्षार्थमायुषः स्वस्थो जातवेगः समुत्सृजेत ॥
(अ.स.सू. 3/2)

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The healthy person, should wake up from bed in the Brahma Muhurtam i.e. around 48 to 96 minutes before the sunrise to preserve his health, after considering the condition of digestion of food taken in previous night whether properly digested or not. Then he should offer prayer to lord Madusudana, so that all the Papa deeds he has indulged in are forgiven by the god.

आयुष्ममुषसि प्रोक्तं मलदीनां विसर्जनम ।
तदन्त्रकूजनाध्मानोदर गौरवारणम ॥
(भा.प्र. 5, यो.र.)

Attending to nature's call (like passing of Mala, Mutra etc.) in early hours is a good habit for better health and problems like Antra Kujanam, Adhmana and Udara Gouravam (heaviness of abdomen) are also relived by attending to natures call in early hours of the day immediately after awakening up from bed at Brahma Muhurtam.

दध्याज्यादर्शसिद्धार्थ बिल्वगोरोचनस्त्रजाम् ।
दर्शनं स्पर्शन कार्यं प्रबुद्धेन शुभावहम् ॥
स्वमाननं घृते पश्येद यदीच्छेच्चिरजीवितम् ॥
(भा.प्र. 5, यो.र.)

One should see and touch Dadhi (curd), Ghrita (ghee), Sarshapa (mustard seeds), Bilwa, Gorochana (cow bile), Pushpa (garlands) etc. immediately after awakening from the sleep. It is good beginning i.e. Subhavaham. Viewing once facial reflection in ghee is good nature's practice for promotion of Dheergha Jeevitam (longer life).

In present century, lifestyle is significantly changed which is creating lot of instability in human energy. It is needed to synchronize the rhythm of inner energy with rhythm of excellent cosmos energy during Brahma Muhurta which is necessary for best immune energy.

Advantages- Quality immune energy is basic requirement for physical, mental, spiritual and social health as well as blissful life. Hence beginning of healthy lifestyle with awakening on Brahma- Muhurta for good practices is needed in present era. It helps to improve immunity at optimum level. It helps to synchronize with cosmos energy rhythm. In 2010, Christoph Randler, a biologist from Harvard University found that early risers are more proactive. Research conducted by Texas University noticed that students who consistently woke up early each day actually scored better test scores and overall grade points, in comparison to those who continues sleep during morning.

Disadvantages- Smrti Ratnavali mentioned that the people who sleeps at the time of Brahma Muhurta they loss their Punnya, they suffer ill health. After morning six Kapha predominance is seen. So people who get up in Kapha Kala tend to be dominated by Tamoguna throughout the day. Bowel movements tend to be sluggish under the influence of Kapha. Mind and body activities become sluggish owing to the influence of Kapha Dosha. After sunrise people awake and the materialistic mental radiations are emitted through their physical senses. The atmosphere is polluted. People will disturb each other dragging themselves to materialistic discussions. Foul smell in mouth, constipation, indigestion, laziness, and many kinds of diseases arises just because of getting late in a day.

One should get more benefits of it by awakening at the time of early morning. Studies have shown morning people are often more positive, more optimistic and more likely to experience satisfaction in their lives.

Usha Jalapana (drinking Water in Early Morning) (Refer-Bha.Pra.5)

सवितुः समुद्यकाले प्रसुतीः सलिलस्य पिबेदष्टौ ।
रोगजरापरिमुक्तो जीवेद्वत्सरशतं साग्रम ॥

अर्शः शोथ ग्रहण्यो ज्वरजठरजराकुष्ठमेदोविकारमुत्राघाता-स्त्रापित्तश्रवणगलशिरः श्रोणिशूलक्तिरोगाः ॥

ये चान्ये वातपित्तक्षतजकफकृता व्याधयःसन्ति जन्तो स्तांस्तानभ्यसयोगदपहरति पयः पीतमन्ते निशायाः । (भा.प्र.)

Acharya Bhavaprakasha explains that the dose of Ushapana is eight Prasruti (640ml). A person who drinks water in this quantity just before sunrise remains free from diseases and aging and lives for more than hundred years. Person drinks water in early morning cannot suffer from Arsha (haemorrhoids), Shotha (swelling), Grahani (dysentery), Jwara (fever), Jathara Vikara (abdomen disorders), Kushtha (skin disorders), Medoroga (disorders of Meda- fat tissue), Mutraghata (urinary diseases), Raktapitta (bleeding disorders),

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Sharavana Gala Shira Roga (ear, throat and head disease), Shroni Shula (neck pain) and Akshi Roga (eye diseases). Ushapana also alleviates Vata, Pitta, kapha and Kshataja Vyadhi.

Importance of Malatyaga in Vata Kaala - Early Morning (Good Bowel Habits)

(Ref- A. Hr. Su.2/1, Bha. Pra. Pa. 5, Yogaratnakara Dinacharya Adhyaya) (Ref- A. Hr. Su.2/1, Bha. Pra. Pa. 5, Y.R. Dinacharya)

शरीरचिन्तां निर्वर्त्य कृतशौचविधिस्ततः ।

(अ.ह्र.सू. 2/1)

The healthy person should get up during Brahma Muhurta to protect his life. After considering the position of digestion or indigestion food taken in previous night. The person should next attend to Shaucha Vidhi (eliminating the Mala and Mutra).

गुदादिमलमार्गाणां शौचं कांन्ति बलप्रदम ।
पावित्र्यकरमायुष्यमलक्ष्मीकलिपापहत ॥

(भा.प्र. 5/22, यो.र.)

Cleaning after defecation, urination etc. keeps those areas clean, promotes complexion, strength, holiness, lifespan and removes poverty, unrest and evils.

प्रक्षालनं हि पाण्योश्च पाद्योः शुद्धिकारणम् ।
मलश्रमहरं वृष्यं चक्षुष्यं राक्षसापहम ॥

(भा.प्र. 5/23, यो.र.)

Washing of hands and legs always leads Malashramahara (cleanliness and removes tiredness), improves Sukra, Chakshushya (eye sight) and prevents the attack of negative force or infection.

Malatyaga (Shauchavidhi)- (Ref- A. S. Su.3/3)

.....जातवेगः समुत्सृजेत् ।
उदङ्मुखो मुत्रशकृद्दक्षिणाभिमुखो निशि ॥
वाचं नियम्य प्रयतः संवीताङ्गोऽवगुण्ठितः ।
प्रवर्तयेत्प्रचलितं न तु यत्नादुदीरयेत् ॥
नामेध्यमार्गमृद्भस्मगोस्थानाकीर्णगोमये ।
पुरान्तिकाग्निवल्मीकरम्योत्वृष्टचिताचिद्रुमे ॥
न नारीपूज्यगोऽर्केन्दुवाय्वग्न्याग्निजलं प्रति ।
न चातिरस्कृत्य महीं भयाशक्त्योस्तु कामतः ॥
न वेगितोऽन्यकार्यः स्यान्नाजित्वा साध्यमामयम् ।

(अ.स.सू. 3/3)

One should excrete the urine and feces only after getting the urge, facing north during daytime and south during night, silently, without diverting attention on other things, having covered the body and head and should allow the excreta to pass naturally on their own and not by strain.

One should not pass them at following places unclean place, road, heaps of soil, ash, cow dung, cow shed, where movement of peoples is there nearer to city, sacrificial altar or on hill, place meant for disposal of dead bodies, under and above the trees. Also not in front of women, respectful persons, cows, sun, moon, wind, fire and water.

In case of fear or handicapped persons the elimination can be done according to one's desire.

निशल्य दुष्टमृत्पिण्डीपरिमृष्टमलाचयन ।
अभ्युधृताभि शुचिभिरद्भिर्मृद्भिश्च योजयेत ॥
लेपगन्धापहं शौचमनुत्पतितबिन्दुभिः ।

(अ.स.सू. 3/3)

After elimination, clean the parts with lumps of mud, which is clean and has no defects (thorn, stones) with pure water drawn out along with mud cleanly to remove the particles and smell in a way that water is not sprinkled on the other part of the body etc.

Mukhaprakshalana and Face Washes used Currently (Ref- Yoga Ratnakara Dinacharya 5/32-33, Su.Chi. 24/15-16, Bha. Pu. Kha. 5/45-46)

(Ref- Yoga Ratnakara Dinacharya 5/32-33, Su.Chi. 24/15-16, Bha. Pu. Kha. 5/45-46, Achamana- A.S.Su.3/4)

मुख प्रक्षालनं शीतपयसा रक्तपित्तजित ।
मुखस्य पिडकाशोषनीलिका व्यगंनाशनम् ॥
कुर्याद्वापि कटुष्णेन पयसा आस्यविशोधनाम ।
कफ़वातहरं स्निग्धं मुखशोषविनाशनम ॥

(यो.र. 5/32-33)

क्षीरवृक्षकषायैर्वा क्षीरेण च विमिश्रितैः ।
भिल्लोदककषायेण तथैवामलकस्य वा ॥
प्रक्षालयेन्मुखं नेत्रे स्वस्थः शीतोदकेन वा ।
नीलिकां मुखशोषं च पिडकां व्यङ्गमेव च ॥
रक्तपित्तकृतान् रोगान् सद्य एव विनाशयेत् ।

(सु.चि. 24/15-16)

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The face wash with Shitala Jala prevents Raktapitta (bleeding problems), subsides Mukhapidika, Mukharoga, Mukhanilika and Vyanga and while washing with warm water pacifies Kapha and Vata Dosha, makes face Snigdha (oily) by removing the Rukshata (dryness) of the face.

Mukha Netra Prakshalana by Bhillvodaka Kashaya or Lodhra Kashaya or Amalaki Kashya or Sheetodaka) helps to relieve the diseases like Neelika, Mukhashosha, Pidika, Vyanga, Raktapitta. Washing with milk provides Snigdhata in Mukha, and also Mukhadoshahara.

A face washes is a skin care product that is designed to remove dead skin cells, oil, dirt, makeup, and other pollutants from the skin, helping to keep pores clear and prevent skin conditions such as acne.

Face Washes- Face wash is the products which are used to cleanse face without drying it out. Face wash is also commonly known as "cleanser". Face wash product found to be equally good for all skin type. Face wash is very helpful in removing dirt, oil and provide moisture to the dry skin. Both face washes & cleansers are used to rid face of dirt, oil, pollution etc. A cleanser dissolves away excess oil makeup and grime from face. These are oil soluble impurities. They can be removed by a face wash too, but that might be not 100% effective. Facial skin is the delicate and ordinary soaps can cause it to lose moisture. A face wash is a mild cleanser that does the vital job of keeping skin clean, germ free smooth and fresh and moisturizes the horny layer without any harshness to the skin. So that skin look young and energetic. The purpose of face wash may be to impart cleansing, anti-wrinkle effect, anti-acne property, moisturizing effect and fairness of skin.

Skin whitening agents are believed to act on the production and metabolism of melanin of the skin by inhibiting melanin production in melanocytes, reducing extent of melanin. The agent which inhibit melanin production, such as propanediol, Evodia rutaecarpa fruit extract, arbutin, kojic acid, vitamin C and its derivatives are used in the whitening cosmetic because of their low toxicity to melanocyte.

Forms of Face Wash-

1. Cream based face wash
2. Gel based face wash
3. Liquid based face wash

Face wash in powder form Types of face wash Generally a face wash suits all skin types however now a day different products are available in market that are formulated to suits different skin types for example: an oily skin face wash is made for people have oily skin conditions and does not contains oils and leaves a thin oily film on the skin.

These different types of face washes available in the market include.

1. Oily skin face wash
2. Dry skin face wash
3. Normal skin face wash Feature of face wash

Content of face wash- Retinol, Benzoyl peroxide, salicylic acid, glycolic acid, Hyaluronic acid, ceramides, vitamin C, glycerine, and chemical and physical exfoliants.

Function of Face Wash-

1. Removing the dead cells.
1. Rejuvenating the skin cells elevate stress
2. Removes oil, dirt and impurities.

Syllabus- Concept of Dantadhavana and modern-day brushing techniques and dentifrices. Concept of Jihwanirlekhana and the tools used in today's era and their benefits.

Learning objectives-

1. Describe the time, procedure, benefits, contraindications and herbs used as per rasa for dantadhavana and modern-day brushing techniques and dentifrices.
2. Describe jihwanirlekhana, explain the tools used in today's era and their benefits.

Concept of Dantadhavana and Modern-day Brushing Techniques and Dentifrices

(Ref- A. Hr.Su.2/2-3, A. S. Su. 3/22, Su.Chi.24/4-12, Cha.Su.5/72-73, Bha. Pra. 5) Ref- A. Hr.Su.2/2-3, A. S. Su. 322, Su.Chi.24/4-12, Cha.Su.5/72-73, Bha. Pra. 5)

click here 24/4-12 dhruvataare

शरिरचिन्तां निर्वर्त्य कृतशौच विधिस्ततः।
अर्कन्यग्रोधखदिरकरजककुभादिजम् ॥
प्रातर्भुक्त्वा च मृद्वग्रं कषायकटुतिक्तकम।
कनीन्यग्रंसमस्थौल्यं प्रगुणं द्वादशाऽगुलम् ॥
भक्ष्येदन्तपवनं दन्तमांसान्यबाधयन ॥
(अ.ह.सू. 2/2-3)

वटासनार्कखदिरकरञ्जकरवीरजम् ।
सर्जारिमेदापामार्गमालतीककुभोद्भवम ।
कषायतिक्तकतुकं मूलमन्यदपीदृशम ।
विज्ञातवृक्षं क्षुण्णग्रमृज्वग्रन्थि सुभूमिजम ।
कनीन्यग्रसमस्थौल्यं सुकूर्च्चं द्वादशाऽगुलम् ।
प्रातर्भुक्त्वा च यतवाग्भक्षयेद्दन्तधावनम ।
(अ.स.सू. 3/12-14)

भक्ष्येद्दन्तपवनं द्वादशांगुलमायतम ।
कनिष्ठिकाऽग्रत्स्थूलमृज्वग्रन्थिं तथाऽव्रणम ॥
एकैकं घर्षयेद्दन्तं मृदुना कूर्चकेन तु ।
दन्तशोधनचूर्णेन दन्तमांसान्यबाधयन ॥
(भा.प्र. 5/24-25)

भक्ष्येद्दन्तपवनं दन्तमांसान्यबाधयन् ।
निहन्ति गन्धं वैरस्यं जिह्वादन्तास्यजं मलम् ॥
निष्कृष्य रुचिमाधत्ते सद्यो दन्तविशोधनम् ।
करञ्जकरवीरार्कमालतीककुभासनाः ॥
शस्यन्ते दन्तपवने ये चान्येवंविधा द्रुमाः ।
(च.सू. 5/72-73)

Timings- One should clean his teeth in two times morning and night, after intake of food with twinges.

Dravya- अर्क, वट, खदिर, करञ्ज and अर्जुन (A.H.Su.2/2-3)

आसन, करवीर, सर्ज, अरिमेद, अपामार्ग, मालती and जाती (A.S.Su.3/13)

Rasa- Kashaya, Katu and Tikta in taste.

Size and shape- Twigs should of size of tip of little finger in thickness (कनीन्यग्रसमस्थौल्यं) and twelve Angula in length (द्वादशा अगुलम्) and straight.

Procedure- Its top made like a soft brush by chewing, the teeth should be cleaned without hurting or injuring the gums.

अवेक्ष्यतुं च दोषं च रसं वीर्यं च योजयेत।
(सु.चि. 24/5-6)

मधुको मधुर श्रेष्ठः करजः कटुके तथा।
निम्बस्तु तिक्तके श्रेष्ठः कषाये खदिरास्तथा ॥
(भा.प्र. 5/27, यो.र.)

In early morning this should be used considering season, Dosha, Rasa and Veerya, as having Kashaya, Madhura, Katu, Tikta rasa.

- Nimba is best among Tikta Rasa.
- Khadira among Kashaya Rasa.
- Madhuka among Madhura Rasa.
- Karaja is best among Katu Rasa.

दन्तान पूर्वमधो घर्षेत प्रातः सिञ्चेच्च लोचनं।
तोयपूर्णमुखो ग्रीष्मशरदोः शीतवरिणा ॥
(अ.सं.सू. 3/11)

The lower row of teeth should be brushed first. Keeping the mouth filled with water the eyes are to be splashed with water every morning with cold water in Grishma and Sarada Rutu.

Tooth Powder and Paste (दन्तशोधन चूर्ण)

क्षौद्रव्योषत्रिवर्गाक्तं सतैलं सैन्धवेन च ॥
चूर्णेन तेजोवत्याश्च दन्तान्नित्यं विशोधयेत्।
एकैकं घर्षयेद्दन्तं मृदुना कूर्चकेन च ॥
दन्तशोधनचूर्णेन दन्तमांसान्यबाधयन्।
(सु.चि. 24/7-8, भा.प्र. 5/25)

व्याप्य त्रिवर्गत्रितयक्षौद्राक्तेन च घर्षयेत।
शनैस्तेन ततो दन्तान दन्तमासान्तबाधयन ॥
(अ.स.सू. 3/5)

क्षौद्रत्रिकटुकाक्तेन तैलसिन्धुभवेन वा ।
चूर्णेन तेजोवत्याश्च दन्तान्नित्यं विशोधयेत ॥
(भा.प्र. 5/26)

Powder of Jejovati mixed with honey, Trikatu, Triphala and Trijataka, oil, Kustha Churna and Sandhava Lavana should be used daily for cleaning teeth. Every tooth should be rubbed with soft brush and tooth powder without injuring the gums.

Benefits

त दौर्गन्धओपदेहौ तु श्लेष्माणं चापकर्षति।
वैशद्यमन्नाभिरुचि सौमनस्यं करोति च ॥
(सु.चि. 24/9)

It removes Daurgandhya (foul smell), Upadaha

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(sliminess), Kapha and provides Vaishadya (clarity), Anna Abhiruchi (desire of food) and Saumanasya (cheerfulness).

Contraindication for Dantadhavana

नाह्यादजीर्णवमथुश्वासकासज्वरार्दिती ।
तृष्णास्यपाकहृन्नेत्रशिरःकर्णामयी च तत् ॥
(अ.हृ.सू. 2/4, अ.स.सू. 3/7)

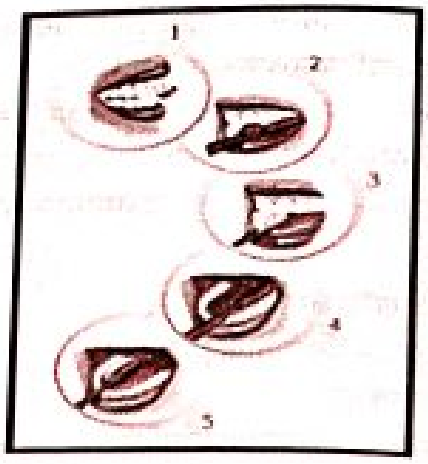
Person suffering from Ajirna (indigestion), Vamathu (vomiting), Kasa (dysponea), Shwasa (cough), Jwara (fever), Ardita (facial paralysis), Trishna (excessive thirst), Asyapaka (mouth ulceration), Hrudya Roga (heart diseases), Netra Roga (eyes diseases), Shira Roga (head diseases) and Karna Roga (ears diseases), should not make use of the Dantadhavana (tooth brushing).

नैव श्लेष्मातकारिष्टबिभितधवधन्वजान ।
बोल्ववञ्जुलनिर्गुण्डीशिग्रुतिल्वकतिन्दुकान ॥
कोविदारशमीपीलुपिप्पिलेङ्गुदगुल्गुलून ।
पारिभद्रकमम्किकामोचक्यौ शाल्मलीं शणम ॥
स्वाद्वम्ललवणं शुष्कं सुषिरं पूति पिच्छिलम ।
पालाशमासनं दन्तधावनं पादुके त्यजेत ॥
(अ.स.सू. 3/8)

Twigs of Slesmataka, Arishta, Bibhitaka, Dhava, Dhavnvan, Bilva, Vancula, Nirgundi, Shigru, Tilvaka, Kovidara, Sami, Pilu, Pippala, Ingudi, Gulgulu, Paribhadraka, Amlika, Mocaka, Salmali and Shana should not be used as tooth brush. So also the twigs of these trees which have Madhura (sweet), Amla (sour) and Lavana (salt) tastes, which are very Shushka (dry), Sushira (hallow), Puti (emitting bad smell) and Picchila (gummy).

Modern-day brushing techniques

1. Gargle clean, fresh water a couple of times and rinse the toothbrush with water.
2. Standard advice is that the front and backs of teeth should be brushed with the toothbrush at a 45-degree angle towards the gum line, moving the brush in a back-and-forth rolling motion that makes contact with the gum line and tooth.
3. To brush the backs of the front teeth, the brush should be held vertically to the tooth and



moved in an up-and-down motion.

4. The chewing surfaces of the teeth are brushed with a forward and back motion, with the toothbrush pointing straight at the tooth.

Conceptof Jihwanirlekhana and the Tools Used in Today's Era and Their Benefits

(Ref- Cha.Su.5/74-75, Su.Chi.24/13, A.S.Su.3/6, Bha. Pra. 5) Ref- Cha.Su.5/74-75, Su.Chi.24/13, A.S.Su.3/6, Bha. Pra. 5)

जिह्वानिर्लेखनं रौप्यं सौवर्णं वाक्षमेवच ।
तन्मलाहरं शस्तं मृदु श्लेष्णं दशाऽगुलम ॥
(सु.चि. 24/13)

जिह्वानिर्लेखनं हैमं राजतं ताम्रजं तथा ।
पाटितं मृदु तत्काष्ठं मृदुपत्रमयं तथा ॥
दशाङ्गुलं मृदु स्निग्धं तेन जिह्वां लिखेत्सुखम ।
तज्जिह्वामलवैरस्यदुर्गन्धजडताहरम ॥
(भा.प्र.5)

सुवर्णरूप्यताम्राणि त्रपुरीतिमयानि च ।
जिह्वानिर्लेखनानि स्युरतीक्ष्णान्यनृजूनि च ॥
जिह्वामूलगतं यच्च मलमुच्छ्वासरोधि च ।
दौर्गन्ध्यं भजते तेन तस्माजिह्वां विनिर्लिखेत् ॥
(च.सू. 5/74-75)

Qualities of Tongue scraper- It should be soft, smooth, curved and ten finger long are to be made of metals like Haima (gold), Rajata (silver), Tamra (cropper), etc.

Benefits- Jihva Mulagata Mala (dirt deposited at the root of the tongue), Daurgandhya and Ucchwasa Rodha (obstruction of the respiration and gives

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rise to foul smell), so the tongue should be scraped regularly.

Tools used for tongue scraper- Ayurveda recommends gold, silver, copper, stainless steel, plastic scarper or branches of certain trees for scrapping of the togue. It should have 10 Angula length. It should be soft and smooth with rounded edges/ margins so that it does not damage the tongue and should be curved so it can be handled easily.

Procedure

1. Use tongue cleaner every day, upon rising, and on an empty stomach.
2. Hold the ends of the tongue cleaner in both hands.
3. Open the mouth and extend the tongue forward.
4. Keep the arched part of the tongue-cleaner on the surface of the tongue (as far back as is comfortable)
5. Gently pull the tongue cleaner forward so that it gently scraps the surface of the tongue and removes the white coating.
6. Rinse the tongue cleaner and repeat as necessary, usually 3-5 times.

Benefits of tongue scraping

1. Clearing toxins, bacteria, and dead cells from the tongue to prevent bad breath.
2. Enhancing the sense of taste.
3. Promoting overall oral and digestive health.
4. Gently stimulating the internal organs.

Syllabus- Concept of Anjana as a health promotive measure. Kavala and gandusha for oral hygiene including mouthwashes available in the market. Abhyanga as health promotive measure. Applied aspects of Sarvanga Abhyanga, Padabhyanga, Shiroabhyanga and their possible physiological effects. Application of Abhyanga according to different age groups and occupation/ activity. Different snehas/oils to be used for daily abhyanga as per seasons and geographical variations.

Learning objectives-

1. Explain the Anjana dravyas for Swastha and their benefits
2. Describe the occupation /activity in which Anjana can be used as a health promotive measure
3. Explain the dravyas used with their doses for Pratimarsha Nasya and their benefits
4. Describe the various kaal for administering Pratimarsha Nasya as per day and season (ritu)
5. Describe the occupation /activity in which Pratimarsha Nasya can be used as a health promotive measure.
6. Describe the ingredients, procedure and benefits of kavala and gandusha for oral hygiene including mouthwashes available in the market
7. Mention different snehas/oils to be used for daily abhyanga as per seasons and geographical variations
8. Describe the applied aspects of Sarvanga Abhyanga, Padabhyanga, Shiroabhyanga
9. Explain the application of Abhyanga according to different age groups and occupation/activity.

Concept of Anjana as a Health Promotive Measure

(Ref- A.H.Su.2/4, Cha.Su.5/16, Su.Chi.24/17-20, A. S.Su.3/24. Bha.Pra.Pu.Kha.5) (Ref- A.H.Su.2/4, Cha.Su.5/16, Su.Chi.24/17-20, A. S.Su.3/24. Bha.Pra.Pu.Kha.5)

सौवीरमञ्जनं नित्यं हितमक्ष्णोस्ततो भजेत।

(अ.ह.सू. 2/4)

सौवीरमञ्जनं नित्यं हितमक्ष्णोः प्रयोजयेत।
पञ्चरात्रे अष्टरात्रे वा स्त्रावणार्थं रसाञ्जनम॥

(च.सू. 5/16)

सौवीरमञ्जनं नित्यं हितमक्ष्णोस्ततोभजेत।
लोचने भवतस्तेन मनोज्ञे सूक्ष्मदर्शन॥

(भा.प्र., अ.स.सू. 3/13)

Sauvirajana is good for eyes, so it should be used Nitya (daily), by this eyes become beautiful and capable of seeing minute things even.

click here -} dhruvataare

चक्षुस्तेजोमयं तस्य विशेषात श्लेष्मतो भयम।
योजयेत सप्तरात्रेतस्मात स्रावणार्थं रसाञ्जनम॥
(अ.ह.सू. 2/5, अ.स.सू. 3/24)

Eye is predominant in Tejas (Agni Mahabhuta) and high risk of troubles especially from Kapha, hence Rasajana should be used once a week, to drain Kapha.

According to Charakacharya Rasajana is applied once in five or eight days at night for lacrimation of eyes.

Method of application

वामेनाक्षि विनिर्भुज्य हस्तेन सुसमाहितः।
शलाकया दक्षिणेन क्षिपेत् कानीनमञ्जनम्॥
आपाङ्गं वा यथायोगं कुर्याच्चापि गतागतम्।
(सु.उ. 18/64-65)

Ask the person to sit comfortably physician should stand in front of him, elevate the upper eye lid of the person with left thumb and apply the collyrium to the interior of lower lid, just below the cornea starting from the Kaninika, slowly moving towards Apanga. After application of collyrium the person should close his eyes and move the eye ball slowly to make uniform distribution. Eye lids are also to be moved slightly. After half an hour it should be washed with water, holding the upper lid with the thumb of left hand, the eye is to be wiped with soft cloth slowly and repeatedly. If the collyium sticking on the lid of the left eye should be wide with right thumb and on that of the right eye by the left thumb.

स्रोतोञ्जन मतं श्रेष्ट विशुद्धं सिन्धुसम्भवन।
दृष्टे कण्डूमलहरं दाहक्लेदरुजापहम॥
अक्ष्णो रूपावहं चेव सहते मारुतातपौ।
नेत्रे रोगा न जायन्ते तस्मादञ्जनमाचरेत॥
(भा.प्र. 5/50-51)

Srotonjana obtain from Sindhu is pure and best. It removes burning, itching and dirt and eliminates watering, pain of eyes, provides brilliance and vision tolerance to wind and sun rays and prevents eye diseases therefore one should applied Anjana regularly.

Contraindication for Anjana

रात्रौ जागरितः श्रान्तश्छर्दितो मुक्तवांस्तथा।
ज्वरातुरः शिरः स्नातो नाक्ष्णोरञ्जनमाचरेत॥
(भा.प्र. 5/52)

भुक्तवाञ्छिरसा स्नातः श्रान्तश्छर्दनवाहनैः।
रात्रौ जागरितश्चापि नाञ्जयाज्ज्वरित एव च॥
(सु.चि. 24/20)

श्रमोदावर्तरुदितमद्य क्रोधभयज्वरैः।
वेगाघातशिरोदोषैश्चार्तानां नेष्यतेञ्जनम॥
रागदुरुतिक्तकमिरास्रावमूलसंरम्भसंभवान।
(सु.उ. 18/68-69)

In person who have not slept during the night, tiredness, Udavarta, crying after taking food, after washing the head, anger, fear or sorrow, during fever, headache, indigestion, suppression of natural urges, thirst, intake of Madya. Person who are exposed to fire or heat of sun, redness of eyes, blindness, excessive lacrimation, pain and swelling, cloudy or rainy weather etc.

Samyaga Anjana Lakshana

विशदं लघ्वनास्रावि क्रियापटु सुनिर्मलम।
संशान्तोपद्रवं नेत्रं विरिक्तं सम्यगादिशेत॥
(सु.उ. 18/75)

Vishada (clear vision), Laghava (lightness), Asrava (no excessive lacrimation), Kriyapatu (proper function), Nirmala (purity of eyes) and Samshanta Upadrava (alleviation of diseases) are to Samyaka Lakshana (proper action) of Anjana.

Pratimarsha Nasya

(Ref- Su.Chi. 40/21, Y. R. Dinacharya Adhyaya, Cha. Si. 9/92, A. H. Su. 20/28-29, Bha. Pra. Pu. Kha. 5)

औषधमौषधसिद्धो वा स्नेहो नासिकाभ्यां दीयत इति नस्यम्। तद् द्विविधम्–शिरोविरेचनं स्नेहनं च। तद् द्विविधमपि पञ्चधा। तद्यथा–नस्यं, शिरोविरेचनं, प्रतिमर्शः, अवपीडः, प्रधमनं च॥ (सु.चि. 40/21)

Sneha processed with drugs are administered through the nostrils, this is called Nasya.

Two types - Shirovirechana and Snehana these two divided in subtypes

click here - dhirajvataare

Five types - Nasya, Shirovirechana, Pratimarsha, Avapida, Pradhamana.

कटुतैलादि नस्यार्थे नित्याभ्यासेन योजयेत्।
प्रातः श्लेष्माणि मध्याह्नेपित्ते सायं समीरणे॥
सुगन्धवदनाः स्निग्धानिः स्वना विमलेन्द्रियाः।
निर्वलीपलितव्यङ्ग भवेयुर्नस्यशीलिनः॥
(यो.र.)

The Nasya should be performed daily with Katu Tila etc. oils in case Kapha predominance, it should be done in the morning, in Pitta after noon, in Vata evenings should be preferred.

The daily practice of Nasya imparts, Sugandhita to body, Snigdhata to speech, cleans the body organs and prevents Vali, Palitya (ageing and graying of hair).

प्रतिमर्शस्तु नस्यार्थं करोति न च दोषवान॥
ततः स्नेहांगुलिं दद्यात प्रातर्निशि च सर्वदा।
न चोच्छिद्येदरोगाणां प्रतिमर्शः सदार्ढ्यकृत॥
(च. सि.9/117)

Pratimarshya is the type of Nasya devoid of any complications. The finger should be dipped in oil and drops should be instilled into nostril. This should be inhaled inside, which makes the body string. As the amount is only two drops, it is devoid of any complications and administer at any time.

Pratimarsha Nasya Kala (time)

प्रतिमर्शश्चतुर्दशसु कालेषूपादेयः। तद्यथाः – तल्पोत्थितेन, प्रक्षालितदन्तेन, गृहान्निर्गच्छता, व्यायामव्यवायाध्वपरिश्रान्तेन, मूत्रोच्चारकवलाञ्जनान्ते, भुक्तवता छर्दितवता, दिवास्वप्नोत्थितेन, सायं चेति॥ (सु.चि. 40/51)

- तल्पोत्थितेन - After getting up from bed.
- प्रक्षालितदन्तेन - After tooth brushing
- गृहान्निर्गच्छता - While going out of the house
- व्यायाम - Being tried due to physical exercise
- व्यवाय - After coitus
- अध्वपरिश्रान्तेन - Travelling on foot
- मूत्रोच्चार - After passing urine and faceces
- कवलाञ्जनान्ते - After gargles and collyrium
- भुक्तवता - After taking food
- छर्दितवता - After vomitting
- दिवास्वप्नोत्थितेन - Awakening from day sleep
- सायं - In the evening

Benefits of Pratimarsha Nasya

तत्र तल्पोत्थितेनासेवितः प्रतिमर्शो रात्रावुपचितं नासास्रोतोगतं मलमुपहन्ति मनःप्रसादं च करोति, प्रक्षालितदन्तेनासेवितो दन्तानां दृढतां यदनसौगन्ध्यं चापादयति, गृहान्निर्गच्छता सेवितो नासास्रोतसः क्लिन्नतया रजो धूमो वा न बाधते, व्यायाममैथुनाध्वपरिश्रान्तेनासेवितः श्रममुपहन्ति, मूत्रोच्चारान्ते सेवितो दृष्टेर्गुरुत्वमपनयति, कवलाञ्जनान्ते सेवितो दृष्टिं प्रसादयति, भुक्तवता सेवितः स्रोतसां विशुद्धिं लघुतां चापादयति, वान्तेनासेवितः स्रोतोविलग्नं श्लेष्माणमपोह्य भक्ताक्वाङ्क्षामापादयति, दिवास्वप्नोत्थितेनासेवितो निद्राशेषं गुरुत्वं मलं चापोह्य चित्तैकाग्र्यं जनयति, सायं चासेवितः सुखनिद्राप्रबोधं चेति॥ (सु.चि. 40/52)

- तल्पोत्थितेनासेवित - Removes dirt of the nasal passage collected in night and provides cheerfulness.
- प्रक्षालितदन्तेना सेवितो - It produces firmness of teeth and Sugandha in mouth.
- गृहान्निर्गच्छता सेवितो - Dust or smoke not harm because of moisturing of the nasal passage.
- व्यायाम मैथुरध्वपरिश्नतेनासेवित - Removes tiredness of physical exercise, coitus and travelling on foot it used thereafter.
- मूत्रोच्चारान्ते सेवितो - Used after passing urine and faces, removes heaviness of eyes.
- कवलाञ्जनान्ते सेवितो - Used at the end of gargle and collyrium it makes the vision clear.
- भुक्तवता सेविता - Used after taking food, it brings purity of passages and lightness.
- वान्तेनासेवित - Used after vomiting it produces desire.
- भक्ताकाङ्क्षामापद्यति - Used after food removing mucus attached to the passage.
- दिवास्वप्नोत्थितेनासेवितोनिद्राशेषं - Used after rising from day sleep, it eliminates the hangover and dirt and produce concentration of mind.
- सायं सावेवित सुखनिद्राप्रबोधं चेति - Used in evening it makes comfortable sleep and easy awakening.

नस्येन रोगाः शाम्यन्ति नराणामूर्ध्वजत्रुजाः।
इन्द्रियाणां च वैमल्यं कुर्यादास्यं सुगन्धि च॥

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हनुदन्तशिरोग्रीवात्रिकबाहुरसां बलम् ।
वलीपलितखालित्यव्यङ्गानां चाप्यसंभवम् ॥
(सु.चि. 40/54-55)

Nasya cures the diseases of Urdhwa Jatrugata (organs above shoulder of human beings) get relieved, Indriya Vaimalya (sense organs become clean), Asya Sugandhi (mouth emits good smell), Hanu Danta Shira Griva Trika Bahu Ura Bala (bestows strength to the lower jaw, teeth, head, neck, upper back, arms and chest) and non-appearance of Vali (wrinkles of the skin), Palitya (grey hairs), Khalitya (baldness) and Vyanga (discolored patches on the face).

Pratimarsha Pramana (Quantity of medicine)

ईषदुच्छिङ्घतः स्नेहो यावद्वक्त्रं प्रपद्यते ।
नस्ये निषिक्तं तं विद्यात् प्रतिमर्शं प्रमाणतः ॥
(सु.चि. 40/53)

Quantity of oil put into the nose which comes into the mouth when the person sucks the air that should be understood as ideal quantity that should be administered as Pratimarsha Nasya.

सम्यक नस्य लक्षण (Feature of Proper Nasya)

तस्य योगातियोगायोगानामिदं विज्ञानं भवति ।
लाघवं शिरसो योगे सुखस्वप्नप्रबोधनम् ।
विकारोपशमः शुद्धिरिन्द्रियाणां मनःसुखम् ॥
(सु.चि. 40/32-33)

In proper use, Laghavam Shiras (lightness of head), Sukha Swapna Prabodhana (easy sleeping and awakening), Vikaropashama (cures the disorders), Shudhi Indriya (clarity of sense organs) and Mana Sukha (cheerfulness).

अतियोग नस्य लक्षण (Features of Excessive Nasya)

कफप्रसेकः शिरसो गुरुतेन्द्रियविभ्रमः ।
लक्षणं मूर्ध्न्यतिस्निग्धे रूक्षं तत्रावचारयेत् ॥
(सु.चि. 40/34)

Kapha Praseka (excessive mucus secretion), Shirasa Guru (heaviness of head), Indriya Vibhrama (dysfunction of sense organs) are the sign of excessive uses Nasya.

अयोग नस्य लक्षण (Feature of Insufficient Nasya)

अयोगे वातवैगुण्यमिन्द्रियाणां च रूक्षता ।
रोगाशान्तिश्च तत्रेष्टं भूयो नस्यं प्रयोजयेत् ॥
(सु.चि. 40/35)

In deficient use, Vata Vaigunya (Vata is vitiated), Indriya Rukshata (roughness appears in organs) and Roga Ashanti (disorder is not alleviated). In such case, appropriate Nasya should be used again.

Kavala and Gandusha for Oral Hygiene Including Mouthwashes Available in the Market

(Ref- Su.Chi.40/62-64, Su.Chi.24/14, Cha.Su.5/78-80, A. Hr. Su.22, A.S.Su.3/15, Bha.Pra. Pu. Kha. 5, Yogaratnakara Dinacharya Adhyaya)

असंचार्या तु या मात्रा गन्डुषः स प्रकीर्तितः ॥
(सु.चि. 40/62)

Mouth is completely filled with Gandusha Dravya and kept without movement is called Gandusha.

Types -	According to Vagbhata :	
Singdha -	Vata	Samana- Pitta
Ropana -	Vrana	Shodhana – Kapha

Dravya use for Gandusha

एवं स्नेहपयःक्षौद्ररसमूत्राम्लसंभृताः ।
कषायोष्णोदकाभ्यां च कवला दोषतो हिताः ॥
(सु.चि. 40/64)

Gargles consisting of Sneha (oils), Paya (milk), Kshaudra (honey), Mamsarasa (meat juice), Mutra (urine), Amla (sour gruel) and also Kashaya (decoction) and Ushna Udaka (hot water) are whole same according to Dosha.

Kavala

सुखं संचार्यते या तु मात्रा स (सा) कवलः स्मृतः ॥
(सु.चि. 40/62)

The Drvaya used moves easily in mouth called as Kavala.

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Procedure of Gandusha and Kavala

तावच्च धारयितव्योऽनन्यमनसोन्नतदेहेन यावद्दोषपरिपूर्णकपोलत्वं नासास्रोतोनयनपरिप्लवश्च भवति तदा विमोक्तव्यः, पुनश्चान्यो ग्रहीतव्य इति ॥ (सु.चि. 40/63)

Gandusha- It should be done with concentration, sitting erect, liquid should be kept in full mouth till Dosha gets filled in mouth or before discharge from nasal passage and eyes; after that, the liquid should be spit out and another quantity of liquid taken in.

Kavala- Method of practicing is same as Gandusha and only difference is that amount is less in Kavala and movements done in Kavala.

Benefits

गण्डुष मथ कुर्वित शीतेन पयसा मुहुः ।
कफतृष्णामलहरं मुखान्तःशुद्धिकारणम् ।
सुखोष्णोदकगण्डुषः कफारुचिमलापहः ।
दन्तजाड्यहरश्चपि मुखलाघवकारकः ॥
(यो.र. 29-30)

Gandusha should be done repeatedly with cold water; it removes Kapha, Trishna and Mala. Gandusha with warm water removes Kapha, Aruchi and strengthen teeth, promotes lightness in the mouth.

Ayogya for Gandusha/ Kavala (Contraindications)

विषमुर्च्छमदार्तानां शोषिणां रक्तपित्तिनाम ।
कुपिताक्षिमल क्षीणरुक्षाणां स न शस्यते ॥
(यो.र.)

It should not be undertaken by the person affected with Visha, Murcha, Mada, Kshaya Roga, Raktapitta, Netra Roga, Ksheena Mala, Ruksha Mala, these people should not practice Gandusha Dharana.

Gandusha Samyaka Yoga Lakshana

व्याधेरेषचयस्तुष्टिर्वैशद्यं वक्त्रलाघवम् ।
इन्द्रियाणां प्रसादश्च कवले शुद्धिलक्षणम् ॥
(सु.चि. 40/65)

Cures the disorders, Upachaya (proper nourishment), Vaishaya (clarity of mouth) and Vaktra Laghava (lightness in the sense organs), this is the features of proper evacuation of Gandusha.

Gandusha Ayogya Lakshana

हीने जाड्यकफोत्क्लेशावरसज्ञानमेव च ।
(सु.चि.40/66)

Improper gargling leads to one suffer from Jadya (stiffness), Kapha Utklesha (excitation of Kapha) and loss of taste sensation.

Gandusha Atiyoga Lakshana

अतियोगान्मुखे पाकः शोषतृष्णाऽरुचिक्लमाः ॥
(सु.चि.40/66)

Excessive use of gargle causes Mukhapaka (stomatitis), Shosha (dryness), Trishna (thirst), Aruchi (anorexia) and Klama (exhaustion).

Mouthwash

Mouthwash, mouth rinse, oral rinse, or mouth bath refers to a liquid that is passively kept in the mouth or swirled around the mouth by contraction of the perioral muscles and/or movement of the head. It may also be gargled; in which case the head is tilted back and the liquid bubbles at the back of the mouth.

While most mouthwashes are antiseptic solutions used to reduce the number of bacteria in the mouth, other mouthwashes may be administered for additional purposes, such as their analgesic, anti-inflammatory, or anti-fungal effect.

Use-

1. Common use involves rinsing the mouth with about 20–50 ml (2/3 fl oz) of mouthwash.
2. The wash is typically swished or gargled for about half a minute and then spat out.
3. The most-commonly-used mouthwashes are commercial antiseptics, which are used at home as part of an oral hygiene routine. Mouthwashes combine ingredients to treat a variety of oral conditions.
4. Variations are common, and mouthwash has no standard formulation, so its use and recommendation involves concerns about patient safety. Some manufacturers of mouthwash state that their antiseptic and antiplaque mouthwashes kill the bacterial

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plaque that causes cavities, gingivitis, and bad breath.

Procedure- Common use involves rinsing the mouth with about 20–50 ml (2/3 fl oz) of mouthwash. The wash is typically swished or gargled for about half a minute and then spat out.

Types of mouthwash

Cosmetic mouthwash: As the name indicates, cosmetic mouthwashes aim to temporarily control the smell of the breath and leave a pleasant taste in the mouth without eliminating germs, as a mouthwash with germ-killing ingredients can do. Therefore their refreshing effect does not last for a extended period.

Fluoride Mouthwash: Fluoride mouthwash helps rebuild weakened tooth enamel in a process called remineralization, making teeth more resistant to decay and tooth erosion. When you use fluoride mouthwash, you help reverse the early signs of tooth decay and keep your teeth healthy.

Antiseptic mouthwash: Antiseptic mouthwash helps eliminate the bacteria that cause bad breath because it contains bacteria-killing substances.

Natural mouthwash: For people who prefer using non-alcoholic products for whatever reason, a natural mouthwash is the choice for you. Natural mouthwashes offer the same benefits as other mouthwashes, except that they are gentle with a milder taste and are alcohol-free.

Whitening mouthwash: Dental care has become more than dental and oral health, as having bright white teeth and an attractive smile is a must have too. People have become greatly keen on getting dental care products that have whitening properties.

Active ingredients used in mouthwashes

1. **Cetylpyridinium chloride**: It is added to mouthwash to reduce bad breath.
2. **Chlorhexidine**: It can be used to help control plaque and gingivitis and generally can't be bought without a prescription.
3. **Essential oils**: Helps control plaque and gingivitis
4. **Fluoride**: It is used to help prevent tooth decay
5. **Peroxide**: Helps teeth whitening
6. **Sodium Fluoride**: used for preventing tooth decay and helping decrease teeth sensitivity.
7. **Eucalyptus**: help prevent plaque and gingivitis
8. **Hydrogen peroxide**:used for teeth whitening and is highly effective in penetrating the hard tissues of the teeth

Chlorhexidine Mouthwash

It is often used as an active ingredient in mouthwash designed to reduce dental plaque and oral bacteria. It has been shown to have an immediate bactericidal action and a prolonged bacteriostatic action due to adsorption onto the pellicle-coated enamel surface.

Composition: Chlorhexidine Gluconate 0.2%, concentrates for dilution, in a flavored mouthwash

Actions: Chlorhexidine is an antiseptic and disinfectant which is effective against wide range of vegetative Gram-positive and Gram-negative organisms, some viruses and some fungi. It is ineffective against bacterial spores at room temperature, and acid-fast bacteria are inhibited but not killed.

Indications: For the treatment of minor oral infections such as mouth ulcers and gingivitis, and in the maintenance of oral hygiene.

Contraindications: Known hypersensitivity to chlorhexidine.

Phenols and essential oils- This mouth rinse product may reduce gingivitis. The pH of the product is low (pH 4.3) cause erosion of dentine and enamel respectively and has the strong taste unacceptable. Due to low oral pH it causes dental erosion. Mouthwashes containing four phenol-related essential oils (thymol, eucalyptol, menthol and methyl salicylate in up to26% alcohol) claim to penetrate the plaque biofilm and thus kill micro-organisms that cause gingivitis. These mouth-washes display broad spectrum antimicrobial activity, prevent bacterial aggregation, slow bacterial multiplication, retard plaque maturation and decrease plaque mass and pathogenicity.

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Delmopinol - Delmopinol is a morpholino ethanol derivative which, in mouth rinses used in the absence of normal oral hygiene, has been shown effective in the inhibition of plaque and gingivitis. Adverse signs and symptoms include transitory numbness of the tongue, tooth and tongue staining, taste disturbance and rarely mucosal soreness and erosion. Tongue and tooth staining, transient anesthesia of the tongue and/or taste disturbance was much more common with 0.2% delmopinol.

Fluoride rinses- Fluoride rinses have the potential for both systemic toxicity and fluorosis. It does not cause systemic toxicity in adults as there is very less chances of ingestion of fluoride in high quantity. In case of children below six years fluoride mouthwash is not prescribed which omits chances of toxicity in them and in case of adults concentration of fluoride is so low that chances of systemic toxicity is very less.

Cetylpyridinium chloride - Which can cause tooth staining. The staining relates to frequency of use and is much less than chlorhexidine when used daily, but similar when used four times a day.

Hexitidine - Diluted alcohol solutions of hexitidine (0.1% and 0.14%) and an aqueous solution of chlorhexidine gluconate (0.2%)were used as mouthwashes in a group of 27 young adults for a period of 21 days. The effect on plaque formation and gingival condition were studied. After 5 and 21 days rinsing with the various mouthwashes the hexitidine 0.1% group had significantly higher plaque index values than the chlorhexidine 0.2% group.

Sanguinarine- Sanguinarine a plant extract, was used in mouth rinses, usually combined with zinc salts. Importantly and very recently, sanguinarine containing mouth rinses have been shown to increase the likelihood of oral precancerous lesions almost tenfold even after cessation of mouth rinse use.

Povidone-iodine- lack appreciable plaque inhibitory activity or action in acute infections such as acute ulcerative gingivitis. Povidone iodine is largely without side effects but as a rinse has potential to affect thyroid function adversely. Prolonged excess intake of iodides can lead to thyroid gland dysfunction including hypo or hyperthyroidism, thyroid gland hyperplasia, thyroid adenoma, goitre.

Conclusion

1. Mouthwash is designed to help improve oral hygiene and protect your gums from diseases.
2. It Helps to freshen breath
3. Help to diminish the amount of plaque on teeth
4. Allergic reactions, both local and systemic, have been reported and so have incidents of alcohol intoxication in children from ingestion of mouth rinses.
5. Dentist and consumer should be aware that mouthwashes may cause adverse effects.

Abhyanga as Health Promotive Measure. Applied Aspects of Sarvanga Abhyanga, Padabhyanga, Shiroabhyanga and Their Possible Physiological Effects. Application of Abhyanga According to Different age Groups and Occupation/ activity. Different Snehas/oils to be used for Daily Abhyanga as Per seasons and Geographical Variations.

(Ref- A.Hr.Su.2/8-9, Cha.Su.5/81-92, Su.Chi.24/30, A. S.Su.3/28, Bha. Pra. Pu. Kha. 5)(Ref- A.Hr.Su.2/8-9, Cha.Su.5/81-92, Su.Chi.24/30, A. S.Su.3/28, Bha. Pra. Pu. Kha. 5)

अभ्यऽगमाचरेनित्यं स जराश्रम वातहा।
दृष्टिप्रसादः पुष्ट्यायुः स्वप्नसुत्वकत्व दार्ढ्यकृत॥
शिरः श्रवण पादेषु तं विशेषेण शीलयेत॥
(अ.हृ.सू. 2/8-9)

अभ्यंगो मार्दवकरः कफ़वातनिरोधनः।
धातुनां पुष्टिजननो मृजावर्णबलप्रदः॥
(सु.चि. 24/30)

अभ्यंगो वातहा पुष्टिस्वप्नदार्ढ्यबृहत्वकृत।
दग्धभग्नक्षतरुजाक्लमश्रमजरापहः॥
रथाक्षचर्मघटद्धवत्यभ्यङ्गतो गुणाः।
स्पर्शनेऽभ्याधिको वायुः स्पर्शनं च त्वगाश्रयम॥
त्वच्यश्च परमभ्यङ्गो यस्मात्तं शीलयेदतः।
शिरः श्रवणपादेषु तं विशेषण शीलयेत॥
(अ.स.सू. 3/28)

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स्नेहाभ्यङ्गाद्यथा कुम्भश्चर्म स्नेहविमर्दनात।
भवत्युपाठादक्षश्च दृढः क्लेशसहो यथा॥
तथा शरीरमभ्यङ्गाद्दृढं सुत्वक् च जायते।
प्रशान्तमारुताबाधं क्लेशव्यायामसंसहम॥
(च.सू. 5/38)

अभ्यंग कारयेन्नित्यं सर्वेष्वेंगेषु पुष्टिदम।
शिरः श्रवणपादेषु तं विशेषण शीलयेत॥
(भा.प्र. 5)

Abhyanga should be practice daily, it delays Jara (aging), cures Shrama (tiredness) and Vata disorders, Drushti Prasad (improves vision) and Pushti (nourishment to the body), Ayu (long life), Swapna (good sleep), Sutvaka (good lustrous skin) and Bala Prada (increase strength). It should be done specially to Shira (head), Karna (ears) and Pada (feet).

One should massage the body with luke warm oil, according to season, in direction of body hair, oil can be used according Dosha, season and conditions. It is performed in seven positions in order. 1. Sitting 2. Supine 3. Left lateral 4. Prone 5.right lateral 6. Supine 7. Sitting with legs extend to the front.

Contraindication for Abhyanga

वर्ज्योऽभ्यङ्गः कफग्रस्तकृतसंशुद्ध्यजीर्णिभिः॥
(अ.ह.सू. 2/9)

Person suffering from Kapha disorder, after Shodhana therapy and Ajirna (indigestion) are unfit for Abhyanga.

Shirobhyanaga (head oil massage)

स केश्यः शीलितो मूर्ध्नि कपालेन्द्रियतर्पण॥
(अ.स.सू. 3/58)

नित्यं स्नेहार्द्रशिरसः शिरःशूलं न जायते।
न खालित्यं न पालित्यं न केशाः प्रपतन्ति च॥
बलं शिरःकपालानां विशेषेणाभिवर्धते।
दृढमूलाश्च दीर्घाश्च कृष्णाः केशा भवन्ति च॥
इन्द्रियाणि प्रसीदन्ति सुत्वग्भवति चाननम्।
निद्रालाभः सुखं च स्यान्मूर्ध्नि तैलनिषेवणात्॥
(च.सू. 5/81-83)

अभ्यंग शीलितो मूर्ध्नि सकलेन्द्रियतर्पकः।
दृष्टितुष्टिकरो हन्ति शिरोभूमिगतान्गदान॥
केशानां बहुतां दार्ढ्यं मृदुतां दीर्घतां तथा।
कृष्णतां कुरुते कुर्याच्छिरसः पूर्णतामपि॥
(भा.प्र. 5)

Daily practice of Shirobhyanaga prevents the Shira Shula (headache), Khalitya (greying of hair), Palitya (hair fall), Bala Shira Kapala (gives strength to skull), Drudamula (hair became firm rooted), Dirgha (long) and Krishna (black), Indriya Prasad Sutvaka (sense organs became cheerful and face with pleasant glow) along with Nidra Labha (sound sleep) and Sukha (happiness).

One who applies sesame oil on his head regularly does not suffer from Shirasula (headache), Khalitya (baldness), Palitya (greying of hair), nor do this Kesha Patana (hair fall). Shirakapala Bala (Strength of his head forehead); Kesha Drudhamula, Dirgha, Krishna (his hair become black, long and deep-rooted); Indriya Prasada (his sense organs work properly); Sitvaga Anana (skin of his face becomes brightened); applying sesame oil on the head produces Nidra Labha (sound sleep) and Sukha (happiness).

Karna Purana

न कर्णरोगा वातोत्था न मन्याहनुसंग्रहः।
नोच्चैः श्रुतिर्न बाधिर्यं स्यान्नित्यं कर्णतर्पणात्॥
(च.सू. 5/84)

हनुमन्याशिरः कर्णशूलघ्नं कर्णपूरणम्।
(अ.स.सू. 3/30)

न कर्णरोगा न मलं न च मन्याहनुग्रहः।
नोच्चैः श्रुतिनं बाधिर्यं स्यानित्यं कर्णपूरणात॥
(भा.प्र.)

Daily practice of Karna Purana is preventing the Karna Roga (disorder and pain of ear) due to Vata Dosha, Manyagraha (stiffness of back and jaws), Shrutirna (hard hearing), Badhirya (deafness) do not occurs.

Padabhyanga (Foot oil massage)

खरत्वं स्तब्धता रौक्ष्यं श्रमः सुप्तिश्च पादयोः।
सद्य एवोपशाम्यन्ति पादाभ्यङ्गनिषेवणात्॥
जायते सौकुमार्यं च बलं स्थैर्यं च पादयोः।
दृष्टिः प्रसादं लभते मारुतश्चोपशाम्यति॥
न च स्याद्गृध्रसीवातः पादयोः स्फुटनं च वा।

click here] dhruvatara

न सिरास्नायुसंकोचः पादाभ्यङ्गेन पादयोः ॥
(च.सू. 5/90-92)

पादाभ्यङ्गस्तु तत्स्थैर्यनिद्रादृष्टिप्रसादकृत ।
पादसुप्ति श्रमस्तम्भ संकोच स्फुटनप्रणुत ॥
(अ.स.सू. 3/31, भा.प्र. 5)

Daily practice of Padabhyanga helps to remove Kharatva (dryness), Stabdhata (stiffness), Raukshya (roughness), Shrama (tiredness) and Supti (numbness instantly). It also makes the skin Saukumarya (smooth), Bala (provides strength) and Sthairya Pada (stability to feet), Nidra Drushti Prasad (improves the sleep and vision) and pacifies Vata. It also prevents diseases like Grudhrasi, Pada Sputana (cracking of foot) and Sirasnayu Sankocha (stiffness of ligaments and tendons) of foot.

Duration of Abhyanga (massage) and effects on the body

रोमान्तेष्वनु देहस्य स्थित्वा मात्राशतत्रयम् ॥
ततः प्रविशति स्नेहश्चतुर्भिर्गच्छति त्वचम ॥
रक्तं गच्छति मात्राणां शतैः पञ्चभिरेव तु ।
षड्भिर्मांसं प्रपद्येत मेदः सप्तभिरेव च ॥
शतैरष्टाभिरस्थीनि मज्जानं नवभिर्व्रजेत् ।
तत्रस्थाञ्छमयेद्रोगान् वातपित्तकफात्मकान इति ॥
(डल्हण टिका सु.चि. 24/30)

300 Matras (94 seconds)- Romanta (up to hair root)

400 Matras (133 seconds) - Twacha (up to skin)

500 Matras (160 seconds) - Rakta (up to blood)

600 Matras (190 seconds) - Mamsa (up to flesh)

700 Matras (228 seconds) - Medas (up to fat)

800 Matras (240 seconds) - Asthi (up to bones)

900 Matras (285 seconds) - Majja (up to bone marrow)

Syllabus - Importance of the Tambula. Prayogika Dhoomapana (Practicable & non-practicable Dhoomapana- inhalation of herbal fumes/ herbal inhalers with their benefits and contraindications. Ill effects of tobacco smoking of various sorts viz. beedi, cigarette, hookah on health.

Learning objective –

1. Justify the importance of the classical tambula by comparing it with the present-day betel chewing.
2. Explain the practical application of Prayogika Dhoomapana (inhalation of herbal fumes/ herbal inhalers) with their benefits and contraindications
3. Explain the ill effects of tobacco smoking of various sorts viz. beedi, cigarette, hookah on health

Importance of The Tambula

(Ref- A. Hr. Su. 2/6-7, A.S.Su.3/20, Cha.Su.5/76-77, Su.Chi.24/11-14, Bha.Pra.Pu.Kha.5)

ततो नावनगण्डुषधूमताम्बूल भाग्भवेत ।
(अ.हृ.सू. 2/6)

After Anjana the person should make use of Navana, Gandusha, Dhuma and Tambula.

रुचिवैशद्यसौगन्ध्यमिच्छन्वक्त्रेण धारयेत् ।
जाति लवग कर्पूर कङ्कोल कटुकैः सह ॥
ताम्बुलिनां किसलयं हृद्यं पूगफलान्वितम् ॥
(अ.स.सू. 3/20)

धूमेनापोह्य हृद्यैर्वा कषायकटुतिक्तकैः ।
पूगैः कर्पूरकस्तूरीलवंगसुमनः फलैः ।
फलैः कटुकषायैर्वा मुखवैशद्यकारिभिः ।
ताम्बूलपत्रसहितै सुगन्धैर्वा विचक्षण ॥
(भा.प्र. 5)

Person who desires good taste, cleanliness and pleasant smell of mouth, should keep in his mouth the tender leaves of Tambula (betel leaves) along with Jati, Lavanga, Karpura, Kankola and Katuka mixed with arec nut. It is very good for heart.

पथ्यं सुप्तोत्थिते भुक्ते स्नाते वान्ते च मानवे ।
द्वित्रमेकं पूगं च सचूर्णखदिरं च तत ॥
(अ.स.सू. 3/38-39)

ताम्बूलमुक्तं तीक्ष्णोष्णं रोचनं तुवरं सरम् ।
तिक्तं क्षारोषणं कामरक्तपित्तकरं लघु ॥
वश्यं श्लेष्मास्यदौर्गन्ध्यमलवातश्रमापहम ।
मुखवैशद्यसौगन्ध्यकान्ति सौष्ठवकारकम ॥
(भा.प्र. 5/173-174)

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Chewing betel leaves is recommended after a night sleep, after a bath, after the meals and after sexual activity in the night. Chewing is said to pacify all three Doshas and cheerfulness, it cleanses the mouth, removing all bad odours, it makes the mouth fragrant, more importantly it causes an extra secretion of saliva, which will increase the digestion. It is also useful after vomiting or when some organic poison has entered the stomach. It adds to conviviality in assemble of likeminded people.

It is advisable 3 to 4 times per day. Excessive chewing of betel leaves causes of impairs the physique, diminishes strength, injuries eye sight, dulls the complexion of the skin, looses teeth and root of hair and causes deafness. It aggravates both Vata and Pitta, excessive chewing weakness the digestive power.

Contraindication for Tambula Sevana

ताम्बूलं क्षतपित्तास्रुरुक्षोत्कुपित चक्षुषाम् ।
विषमुर्च्छामदार्तानांमपथ्यं शोषिणामपि ॥
(अ.ह्र.सू. 2/7)

रक्तपित्त क्षतक्षीण रुक्षोत्कुपितचक्षुषाम् ।
विषमुर्च्छामदर्तानांमपथ्यं शोषणां च तत ॥
(अ.सं.सू. 3/37-38)

It is Apathya (contraindication) for person who is suffering from the disease Raktapitta, Kshata (wounds), Ruksha (dryness) and Utkupita Chakshu (redness of eyes), Visha (poisoning effects), Murccha (unconsciousness), Mada (intoxication) and Shosha (emaciation).

Prayogika Dhoomapana (Practicable & Non-practicable) Dhoomapana- Inhalation of Herbal Fumes/ Herbal Inhalers with their Benefits and Contraindications

(Ref- Cha.Su.5/33-35, Su.Chi.40/3,7-8,13, A. Hr. Su.21, A.S. Su. 3/16)

प्रायोगिकं ततो धूमं गन्धमाल्यादिचाचरेत ।
धूमादस्योर्ध्वजत्रूत्था न स्युर्वात कफामया: ॥
(अ.स.सू. 3/16)

One should undertake use of Dhumapana and application of Gandhamalya (garland of flower) etc. Dhumapana cures the diseases of existing above the clavicles and diseases due to Vata and Kapha do not occurs by taking Dhumapana regularly.

Types:

धूमः पञ्चविधो भवति; तद्यथा-प्रायोगिकः, स्नैहिको, वैरेचनिकः, कासघ्नो, वामनीयश्चेति ॥ (सु.चि. 40/3)

Dhumapana Types- Prayogika, Snehika, Virechanika, Kasaghna and Vamaniya.

Snaihika Dhumapana Dravya

वसाघृतमधूच्छिष्टैर्युक्तियुक्तैर्वरौषधैः ।
वर्तिं मधुरकैः कृत्वा स्नैहिकीं धूममाचरेत ॥
(च.सू. 5/26)

One should smoke unctuous cigars made of useful drugs of sweet taste along with Vasa (fat of muscle), Ghritha (ghee) and Madhuyasti (bee wax) according to the prescribed method.

Vairechanika Dhumapana Dravya

श्वेता ज्योतिष्मती चैव हरितालं मनःशिला ।
गन्धाश्चागुरुपत्राद्या धूमं मूर्धविरेचने ॥
(च.सू. 5/27)

Shweta, Jyotishmati, Haratala, regular and other fragrant articles like Agaru, Patra etc. Prepare Kalka (paste) of these Drvaya and make Varti (cigar). This types of Dhumapana Varti is good in Murdhivirechana (elimination of Doshas from head) a therapeutic procedure.

Dhumapana Vidhi (procedure of inhaling medicinal smoke)

मुखेन तं पिबेत् पूर्वं नासिकाभ्यां ततः पिबेत् ।
मुखपीतं मुखेनैव वमेत् पीतं च नासया ॥
मुखेन धूममादाय नासिकाभ्यां न निहरित् ।
तेन हि प्रतिलोमेन दृष्टिस्तत्र निहन्यते ॥
विशेषस्तु प्रायोगिकं घ्राणेनाददीत, स्नैहिकं ।
मुखनासाभ्यां, नासिकया वैरेचनिकं, मुखेनैवेतरौ ॥
(सु.चि. 40/7-8)

First, smoke should be inhaled from mouth and next through the nostrils, that inhaled through mouth should be let out by the mouth itself and so also that smoke inhaled by nose the smoke inhaled by mouth should be let out through the nose by doing so.

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smoke travelling in opposite direction destroys vision.

Prayogika Dhumapana should be inhaled especially through the nose, Snaihika Dhumapana inhaled through the mouth and nose both. Virechanika should be through the nose and other Kasaghna and Vamaniya through the mouth only.

Timing for Dhumapana

प्रयोगपाने तस्याष्टौ कालाः संपरिकीर्तिताः ।
वातश्लेष्मसमुत्क्लेशः कालेष्वेषु हि लक्ष्यते ॥
स्नात्वा भुक्त्वा समुल्लिख्य क्षुत्वा दन्तान्निघृष्य च ।
नावनाञ्जननिद्रान्ते चात्मवान् धूमपो भवेत् ॥
तथा वातकफात्मानो न भवन्त्यूर्ध्वजत्रुजाः ।
रोगास्तस्य तु पेयाः स्युरापानास्त्रिस्त्रयस्त्रयः ॥

(च.सू. 5/33-35)

Eight times are prescribed for smoking as a daily routine because in these times the aggravation of Vata and Kapha Dosha. A cautions person should smoke after Snana (bath), Bhuktva (meals), Samullikhya (vomiting), Kshutva (sneezing), Danta Dhavana (tooth brushing), Navana (snuffing), Anjana (use of collyrium) and Nidra (sleep). Thus, diseases of part above Jatru and predominant in Vata and Kapha do not arise. Smoking should be done thrice with three puffs each time.

आद्यास्तु त्रयो धूमा द्वादशसु कालेषू पाद्येयाः । तद्यथा-क्षुतदन्तप्रक्षालन नस्य स्नान भोजन दिवास्वप्न मैथुनच्छर्दि मूत्रोच्चारहसितरुषित शस्त्र कर्मान्तेष्विति । तत्र विभागो-मूत्रोच्चारक्षवथु हसितरुषितमैथुनान्तेषुस्नैहिकः, स्नानच्छर्दन-दिवास्वप्न प्रान्तेषु वैरेचनिकः, दन्तप्रक्षालनस्य, भोजन शस्त्र कर्मान्तेषु प्रायोगिकः इति ॥ (सु. चि. 40/13)

Snaihika - Mutra, Kshavathu, Hasita-Rushita, Maithuna.

Vairechanika - Snana, Chardi, Divasvapna.

Prayogika - Dantaprakshalana, Bhojana, Shastrakarma.

Total number - 12 times

परं द्विकालपायी स्यादहः कालेषु बुद्धिमान ।
प्रयोगे, स्नैहिके त्वेकं, वैरेच्यं त्रिचतुः पिबेत ।

(च.सू. 5/36)

Prayogika Dhumapana (habitual variety) - Twice daily

Snaihika Dhumapana (unctuous variety)- once in Vata Vruddhi.

Vairechanika Dhumapana (elimination variety) - 3 to 4 times in Kapha Vruddhi.

Dhuma Yantra - Smoking Apparatus

The smoke apparatus should be prepared from the same material as of enema nozzle (from metals like gold, silver, iron etc);

- It should have three chambers
- It should be straight
- It should permit the entry of the thumb and a Kolasthi- seed of jujube fruit through orifices at its root and tip respectively.

The length of the tube should be 24 Angula (width of one knuckle) for Mrudu (soft, Sneha) Dhuma 32 Angula for medium Dhuma and 40 Angula for strong Virechana Dhuma.

Dhumapana Vidhi - Method of inhalation

The patient should sit straight, be attentive, with his mouth open and inhale the smoke through each nostril alternatively, While inhaling from one nostril, he should close the other. Inhalation should be done thrice - inhaling the smoke and letting it out together forms one bout, Three such bouts should be done each time.

Smoke should be inhaled through the nose first if the imbalanced Doshas are localized in the nose and head.

If Dosha from nose and head are not coming out, but are adhering, inhalation should be done first through the mouth to make them move; and later through the nose. When the Doshas are localized in the throat - inhalation should be done in reverse order-first by the nose and later by the mouth.

The smoke inhaled (either from mouth or from nose) should be let out only through the mouth; if let out through the nose, it produces loss of vision.

Smoking should be done thrice, with three inhalations and three exhalations alternately.

Snigdha (lubricating), mild kind of smoke should be taken for only set of three inhalation and exhalations, during day time.

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Madhya (medium kind) - two sets of 3 inhalations and exhalations and Shodhana- purgative, strong kind, 3-4 sets of 3 inhalations and exhalations.

Dhuma Dravyani

Mridu Dhuma (mild kind of smoke)- useful drugs are- Aguru, Guggulu, Musta, Sthauneya, Shaileya, Nalada, Usheera, Vālaka, Varanga, Kounti, Madhuka, Bilvamajja, Elavaluka, Shrivestaka, Sarjarasa, Dhyamaka, Madana, Plava, Shallaki, Kumkuma, Masha, Yava, Kunduruka, Tila, oil obtained from fruits and pith of trees, fat, marrow, muscle- fat and ghee.

Shamana Dhuma (Madyama - medium kind of smoke)- useful drugs are Shallaki, Laksha, Prithvika, Kamala, Utpala, Barks of Nyagrodha, Udumbara, Asvattha, Plaksa and Rodhra; Sita, Yasthimadhu (licorice), Suvarnatwak, Padmaka, Raktayastika Kustha, Tagara and other scents - perfumeries.

Teekshna Dhuma (Strong, Purgative kind of smoke)- useful drugs are Jyotismati, Nisha (turmeric), Dashamula, Ala, Laksa, Shweta, Triphala, Substances which have strong smell and drugs of Murdha Virechana Gana.

Benefits of Dhumapana

गौरवं शिरसः शूलं पीनसार्धावभेदकौ ।
कर्णाक्षिशूलं कासश्च हिक्काश्वासौ गलग्रहः ॥
दन्तदौर्बल्यमास्रावः श्रोत्रघ्राणाक्षिदोषजः ।
पूतिघ्राणास्यगन्धश्च दन्तशूलमरोचकः ॥
हनुमन्याग्रहः कण्डूः क्रिमयः पाण्डुता मुखे ।
श्लेष्मप्रसेको वैस्वर्यं गलशुण्डयुपजिह्विका ॥
खालित्यं पिञ्जरत्वं च केशानां पतनं तथा ।
क्षवथुश्चातितन्द्रा च बुद्धेर्मोहोऽतिनिद्रता ॥
धूमपानात् प्रशाम्यन्ति बलं भवति चाधिकम् ।
शिरोरुहकपालानामिन्द्रियाणां स्वरस्य च ॥
न च वातकफात्मानो बलिनोऽप्यूर्ध्वजत्रुजाः ।
धूमवक्त्रकपानस्य व्याधयः स्युः शिरोगताः ॥
(च.सू. 5/27-32)

Dhumapana cures Gaurava (heaviness) and Shira Shula (pain in head), Pinasa (chronic rhinitis), Ardhava Bhedaka (headache), Karna Akshi Shula (eye and ear pain), Kasa (cough), Hikka (hiccup), Shwasa (dyspnoea), Galagraha (spasm in throat), Danta Daurbalya (weakness of teeth), Strava Shrotra Ghrana Akshi (discharge due to disorder of ear, nose and eyes), Puti Ghrana Asya Gandha (bad smell from nose and mouth), Danta Shula (toothache), Arochaka (anorexia), Hanuman-yagraha (spasm in jaw and back neck), Kandu (itching), Krimi (worms), Panduta Mukha (paleness of face), Shleshma Praseka (excessive salivation), Vaisvarya (disorder of voice), Galashundi (tonsillitis), Upajihvika (enlarged Uvula), Khalitya (alopecia / baldness), Pinjaratva (grey hairs), Kesha Patana (hairs falling), Kshavathu (sneezing), Atitandra (excessive drowsiness), Buddhi Moha (lack of function of intellect), Atinidra (excessive sleep) etc. Person will not be affected by strong disorders of Vata and Kapha pertaining to Urdhwajatru (neck) and Shiras (head).

Features of proper Dhumapana

हृत्कण्ठेन्द्रियसंशुद्धिर्लघुत्वं शिरसः शमः ।
यथेरितानां दोषाणां सम्यक्पीतस्य लक्षणम् ॥
(च.सू. 5/37)

Samshuddhi of Hrudya, Kantha and Indriya (clarity of mind, throat and sense organs), Shiras Laghutva (lightness of head) and Dosha Shamana (elimination of the Doshas) are features of proper smoking.

Features of Excessive Dhumapana

बाधिर्यमान्ध्यमूकत्वं रक्तपित्तं शिरोभ्रमम् ॥
(च.सू. 5/38)

तालुगलशोष परिदाह पिपासा मूर्च्छा भ्रम मद कर्णक्ष्वेड दृष्टि नासारोग दौर्बल्यान्यतियोगो जनयति ॥ (सु.चि. 40/17)

Smoking used in excess and untimely causes complication such as Badhirya (deafness), Andhatva (blindness), Muka (dumbness), Raktapitta (internal hemorrhage), Shirobhrama (vertigo), Pipasa (thirst), Murccha (fainting), Karna

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Sweda (noise in ears), Nasa Roga (diseases of nose) and Daurbalya (debility) are the features of Atiyoga.

Features of Improper Dhumapana

अविशुद्धः स्वरो यस्य कण्ठश्च सकफो भवेत्।
स्तिमितो मस्तकश्चैवमपीतं धूममादिशेत्॥

(च.सू. 5/53)

Avishuddha Swara (impairment of voice), Sakapha Kantha (presence of Kapha in the throat) and Stimita Masatakah (rigidity of head head) are the features of insufficient smoking.

Contraindication for Dhumapana

तत्र शोकश्रम भयामर्षाण्यविषरक्तपित्त मदमूर्च्छा दाहपिपासापाण्डुरोगतालुशोषच्छर्दि शिरोऽभिघातोद्वारापतर्पित तिमिर प्रमेहोदराध्मानोर्ध्ववातार्ता बालवृद्धदुर्बलविरिक्ता स्थापित जागरित गर्भिणी रूक्ष क्षीणक्षतोरस्कमधुघृतदधिदुग्ध मद्य यवागू पीताल्पकफाश्च न धूममासेवेरन्॥ (सु.चि. 40/11)

परं त्वतः प्रवक्ष्यामि धूमो येषां विगर्हितः।
न विरिक्तः पिबेद्धूमं न कृते वस्तिकर्मणि॥
न रक्ती न विषेणार्तो न शोचन्न च गर्भिणी।
न श्रमे न मदे नासे न पित्ते न प्रजागरे॥
न मूर्च्छाश्रमतृष्णासु न क्षीणे नापि च क्षते।
न मद्यदुग्धे पीत्वा च न स्नेहं न च माक्षिकम्॥
धूमं न भुक्त्वा दध्या च न रूक्षः क्रुद्ध एव च।
न तालुशोषे तिमिरे शिरस्यभिहते न च॥
न शङ्खके न रोहिण्यां न मेहे न मदात्यये।
एषु धूममकालेषु मोहात् पिबति यो नरः॥
रोगास्तस्य प्रवर्धन्ते दारुणा धूमविभ्रमात्॥

(च.सू. 5/41-46)

Virikta Krute Bastikarmani (A person after taking Virechana or Basti), Rakti (a person having bleeding through different orifices of the body), Visharta and Shochana (one afflicted with toxins and a grief), Garbhini (a pregnant woman), Shrama (fatigued), Mada (intoxicated), Ama (disease due to improper digestion), vitiation of Pitta, Murcha (unconsciousness), Bhrama (giddiness), Trishna (excess thirst) Kshina (emaciated) and Kshata(injury). One should not smoke after having taken Madya (liquor) or Dugdha (milk) or Sneha (fatty substances) or Makshika (honey) or Dadhi (curd), nor one should smoke when there is roughness in his body or he is angry. Smoking is also prohibited in the event of the Talushosha (dryness of palate), Timira (fainting), Shiras Abhihate (injury to the head), Shankhaka (a type of headache in the temporal region marked by excessive pain and swelling- Usually killing a patient in three days), Meha (diabetes) and Madatyaya (alcoholism). If person takes in above conditions, he will be subjected to severe disorders.

III Effects of Tobacco Smoking of Various Sorts Viz. Beedi, Cigarette, Hookah on Health

Tobacco smoke contains more than 70 chemicals that causes the cancer. It also contains nicotine, which is a highly addictive psychoactive drug. When tobacco is smoked, nicotine causes physical and psychological dependency. Cigarettes sold in underdeveloped countries tend to have higher tar content, and are less likely to be filtered, potentially increasing vulnerability to tobacco smokingrelated diseases in these regions.

Tobacco use most commonly leads to diseases affecting the heart, liver and lungs. Smoking is a major risk factor for infections like pneumonia, heart attacks, strokes, chronic obstructive pulmonary disease (COPD) (including emphysema and chronic bronchitis), and multiple cancers particularly lung cancer, cancers of the larynx and mouth, bladder cancer, and pancreatic cancer). It also causes peripheral arterial disease and high blood pressure. The effects depend on the number of years that a person smokes and on how much the person smokes. Tobacco use is a significant factor in miscarriages among pregnant smokers. other health problems of the foetus such as premature birth, low birth weight, and increases by 1.4 to 3 times the chance of sudden infant death syndrome. Incidence of erectile dysfunction is approximately 85 percent higher in male smokers compared to non-smokers. Hookah smoking is

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linked to many of the same adverse health effects as cigarette smoking, such as lung, bladder and oral cancers and heart disease.

Syllabus- Concept of Vyayama and present-day practices such as aerobic exercises, muscle strengthening exercises etc.to be practiced as per prakriti, age and occupation. Ardhashakti lakshanas of vyayama and the consequences of ati vyayama.

Learning objectives-

1. Explain the indications, contraindications and benefits of Vyayama.
2. Describe the types & benefits of vyayama and present-day practices such as aerobic exercises, muscle strengthening exercises etc.to be practiced as per prakriti, age and occupation.
3. Describe the assessment of ardhashakti lakshanas of Vyayama and the consequences of ati vyayama.

Concept of Vyayama

(Ref- A. Hr. Su. 2/10-13, A.S.Su.3/33-38, Cha.Su.7/32-35, Su.Chi.24/37-50 Dalhana com, Bha. Pra.Pu.Kha.5)

शरिरायासजननं कर्म व्यायामसंज्ञितम ।
(सु.चि. 24/38)

लाघवं कर्मसामर्थ्यं दिप्तोऽग्निर्मेदसः क्षयः ।
विभक्त घनगात्रत्वं व्यायामादुपजायते ॥
(अ.ह.सू. 2/10)

शरीरायासजननं कर्म व्यायाम उच्यते ।
लाघवं कर्मसामर्थ्यं दिप्तोऽग्निर्मेदसः क्षयः ॥
विभक्त घनगात्रत्वं व्यायामादुपजायते ॥
(अ.स.सू. 3/61)

शरिरचेष्टा या चेष्टा स्थैर्यार्था बलवर्धिनी ।
देहव्यायामसंख्याता मात्रया तां समाचरते ॥
(च.सू.7/31)

लाघवं कर्मसामर्थ्यं विभक्तघन गात्रत्वं ।
दोषक्षयोऽग्निवृद्धिश्च व्यायामादुपजायते ॥
(भा.प्र. 5/47-48)

The action which produces Sharira Ayasa Janana (tiredness in body) is Vyayama (exercise). Such suitable physical movement intended towards bringing stability (in body) and increase in strength is known as Vyayama (physical exercise). This has to be practiced in moderation (with apt control and for proper duration).

The physical action, which enhancing the Karma Samarthya (strength of the body), Dipta Agni (increases the digestive fire), Dosha Kshaya, when performed in the required times is called Vyayama.

Benefits of Vyayama

लाघवं कर्मसामर्थ्यं दिप्तोऽग्निमेदसः क्षयः ।
विभक्तघनगात्रत्वं व्यायामादुपजायते ॥
(अ.ह.सू. 2/10)

लाघवं कर्मसामर्थ्यं स्थैर्यं दुःखसहिष्णुता ।
दोषक्षयोऽग्निवृद्धिश्च व्यायामादुपजायते ॥
(च.सू. 7/32)

Laghavam (lightness of body), Karma (ability to work), Samarthya/ Sairya (stability), Agni Vruddhi (increase the digestion proper), Medas Kshaya (depletion of excess fat), Dosha Kshaya (reduction of Dosha) are the benefits of Vyayama.

Contraindication for Vyayama

वातपित्तामयी बालोवृद्धोऽजीर्णी च त त्यजेत ।
(अ.ह.सू.2/11, अ.स.सू. 3/35)

भुक्तवान्कृतसम्भोगः कासी श्वासी कृशः क्षयो ।
रक्तपित्तो क्षती शोषी न तं कुर्यात्कदाचन ॥
(भा.प्र.)

Person suffering from disease of Vata and Pitta, Kasa, Shwasa, Krusha, Kshaya, Raktapitta, Injured, Shosha, children, old age, those having indigestion, after food and after Maithuna karma should avoid Vyayama.

Present-Day Practices Such as Aerobic Exercises, Muscle Strengthening Exercises etc. to be Practiced as per Prakriti, Age and Occupation

Exercise is a body activity that enhances or maintains physical fitness and overall health and

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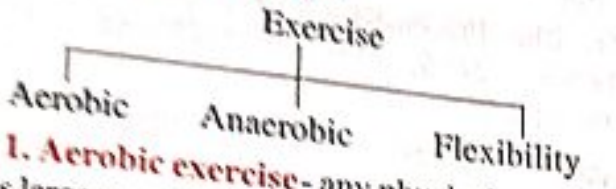
wellness. It is performed for various reasons, including weight loss or maintenance, to aid growth and improve strength, develop muscles and the cardiovascular system, hone athletic skills, improve health, or simply for enjoyment. Many individuals choose to exercise outdoors where they can congregate in groups, socialize, and improve well-being as well as mental health.

Classification of exercise



1. Aerobic exercise- any physical activity that uses large muscle groups and causes the body to use more oxygen than it would while resting. The goal of aerobic exercise is to increase cardio-vascular endurance. Examples of aerobic exercise include running, cycling, swimming, brisk walking, skipping rope, rowing, hiking, dancing, playing tennis, continuous training, and long distance running.

2. Anaerobic exercise- which includes strength and resistance training, can firm, strengthen, and increase muscle mass, as well as improve bone density, balance, and coordination. Examples of strength exercises are push-ups, pull-ups, lunges, squats, bench press. Anaerobic exercise also includes weight training, functional training, Eccentric Training, interval training, sprinting, and high-intensity interval training which increase short-term muscle strength.

3. Flexibility exercises – It is stretch and lengthen muscles. Activities such as stretching help to improve joint flexibility and keep muscles limber. The goal is to improve the range of motion which can reduce the chance of injury.

Benefits of exercise

- Physical exercise is important for maintaining physical fitness and can contribute to maintaining a healthy weight, regulating the digestive system, building and maintaining healthy bone density, muscle strength, and joint mobility, promoting physiological well-being, reducing surgical risks, and strengthening the immune system. Some studies indicate that exercise may increase life expectancy and the overall quality of life.
- People who participate in moderate to high levels of physical exercise have a lower mortality rate compared to individuals who by comparison are not physically active.
- Moderate levels of exercise have been correlated with preventing aging by reducing inflammatory potential.

Physical activity according Age and other conditions

Age and other conditions	Duration
Infants (less than 1 year) Children 1-2 and 3-4 years of age	30 min-1 hour 180 minutes
Children and adolescents aged 5-17 years	60 minutes
Adults aged 18–64 years	75-150 minutes
Adults aged 65 years and above	75-150 minutes
Pregnant and postpartum women	150 minutes
People living with chronic conditions (hypertension, type 2 diabetes, HIV and cancer survivors)	150–300 minutes
Children and adolescents living with disability	60 minutes
Adults living with disability	150–300 minutes

Ardhashakti Lakshanas of Vyayama and The Consequences of Ati Vyayama

Features of proper exerciseFeatures of proper exercise

स्वेदागमः श्वासवृद्धिर्गात्राणां लाघवं तथा।
हृदयाद्युपरोधश्च इति व्यायामलक्षणम्॥
(च.सू. 7/33(1))

Swedagama (sweating), Shwasa Vruddhi (increased respiration rate), Gatranam Laghavam (lightness in the body), and Hrudayadi Uparodha

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(increased heart rates) are the features of proper exercise.

Ativyayama (effects of excessive exercise)

तृष्णा क्षयः प्रतमको रक्तपित्तं श्रमः क्लमः।
अतिव्यायामतः कासो ज्वरछर्दिश्च जायते॥
व्यायाम जागराध्वस्त्रीहास्यभाष्यादि साहसम।
गजंहिं इवाकर्षन भजन्नतिविनश्यति॥
(अ.ह.सू. 2/13-14)

अतिव्यायामतः कासो ज्वरछर्दिश्चः श्रमः कलमः।
तृष्णा क्षयः प्रतमको रक्तपित्तं च जायते॥
(भा.प्र. 5/55)

Excessive exercise leads Trishna (thirst), Kshaya (emaciation), Pratamaka (difficulty to breath), Raktapitta (bleeding disorder), Shrama (tiredness), Kasa (cough), Klama (fatigue), Jwara (fever) and Chardi (vomiting) etc.

Ativyayama (excessive exercise), Ratri Jagarana (awakening in night), Vyavaya (excessive sexual intercourse), Hasya Bhasya Sahasa (over speaking and laughing), overstraining destroys the persons as lion which tries to drag the elephant gets destroyed.

Vyayama Matra and Vyayama Kala

अर्धशक्ता निषेव्यस्तु बलिभिः स्निग्धभोजिभि।
शीतकाले वसन्ते च, मन्दमेव ततोऽन्यदा॥
(अ.ह.सू. 2/11)

Person who are Balibhi (strong) and Snigdha Bhoji (indulge in fatty foods daily), in Shita Kala (cold seasons) and Vasanta (spring) should do it half of their strength only, while others in other season should mild exercise.

Chankramana (Mild Exercise or Mild Walking)

यत्तु चङ्क्रमणं नातिदेहपीडाकरं भवेत्।
तदायुर्बलमेधाग्निप्रदमिन्द्रियबोधनम् ॥
(सु.चि. 24/80)

Moderate walking does not cause much trouble to the body, Ayu (enhances life span), Medha (intelligence), stimulates the Agni (digestive power) and Indriya (sense organs).

Syllabus- Udwartana, Utsadana and Udgharshana.

Learning objectives- Describe and compare the dravyas, benefits, and application of Udvartana, Udgharshana and Utsadana.

Udwartana, Utsadana, Udgharshana

(Ref- A. S. Su. 3/39, A.Hr.Su. 2/15, Su.Chi.24/51-56, Bha. Pra.Pu.Kha.5)(Ref- A. S. Su. 3/39, A.Hr.Su. 2/15, Su.Chi.24/51-56, Bha. Pra.Pu.Kha.5)

उद्वर्तनं कफहरं मेदसः प्रविलायनम।
स्थिरीकरणमङ्गानां त्वकप्रसादकरं परम॥
(अ.सं.सू. 3/39, अ.ह.सू. 2/15)

Udvartana mitigates Kapha, Medas Pravilayana (liquefies the fat), Stirikarana Angana (produce stability of the body parts) and Twaka Prasadakara (excellence of the skin).

उद्वर्तनं वातहरं कफमेदोविलापनम्।
स्थिरीकरणमङ्गानां त्वक्प्रसादकरं परम्॥
(सू.चि. 24/51)

Udvartana mitigates aggravation of Vata and Kapha, Medovilapana (liquefies the fats), Stirikarana Angana (stability of the body) and Twaka Prasadakara (cleanses the skin).

उद्वर्त्तन कफ़हरं मेदोघ्नं शुक्रदं परम।
बल्यं शोणितकृच्चापि त्वकप्रसादमृदुत्वकृत॥
(भा.प्र. 5)

Udvartana mitigates Kapha and Medas, Shukra Vardhaka, Balya, increases the Rakta and Twaka Prasadakara (cleanses the skin).

Uddhgharshana and Utsadana

उद्धर्षणम् अस्नेहौषधचूर्णादिभिघर्षणम्।
सस्नेह कल्केनोद्धर्षणमुत्सादनम॥
(डल्हण सु.चि. 24/52-56)

Uddhagharshana means massage with powder of herb without oil.

Utsadana means massage with paste of herbs along with oil.

Benefits of Udvartana

सिरामुखविविक्तत्वं त्वक्स्थस्याग्नेश्च तेजनम्।

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उद्धर्षणोत्सादनाभ्यां जायेयातामसंशयम् ॥
उत्सादनाद्भवेत् स्त्रीणां विशेषात् कान्तिमद्वपुः ।
प्रहर्षसौभाग्यमृजालाघवादिगुणान्वितम् ॥
उद्धर्षणं तु विज्ञेयं कण्डूकोठानिलापहम् ।
ऊर्वोः सञ्जनयत्याशु फेनकः स्थैर्यलाघवे ॥
कण्डूकोठानिलस्तम्भमलरोगापहश्च सः ।
तेजनं त्वग्गतस्याग्नेः सिरामुखविवेचनम् ।
उद्धर्षणं त्विष्टिकया कण्डूकोठविनाशनम् ॥

(सू.चि. 24/52-56)

Uddhagharshana dilated blood vessels and enhances the Agni in skin. Utsadana enhances the complexion in womens, gives Praharsha (pleasure and cleanliness), Saubhagya (auspicious), Laghava (feeling of lightness) and such other beneficial qualities.

Uddhagharshana cures itching; eruptions and a disorder of Vata, use of Phenaka (soap nut) bring about stability and lightness to the thighs and mitigates Kandu (itching), Kotha (rashes), inactivity of Vata and Mala Roga (wards off dirt and diseases). Massaging with the powder enhance the Agni of skin, Sira Mukha Vivechana (dilates the veins) and cures Kandu (itching) and Kotha (rashes).

Indications for Utsadana (Snigdha Udvartana)

1. Where there is severe morbidity of Vayu
2. When the patient is weak
3. When we intend Udvartana to provide strength.
4. When there is instability or laxity of body parts and when we are intending to provide stability (Sthairyakaram).
5. Where the condition is more painful.
6. Where the skin is depleted of nutrition, lacking lustre and devoid of complexion or glow, to improve skin immunity and health.
7. Where the patient has dry skin.
8. When the patient is of Vata Prakriti (constitution) or having Vata Vikriti (diseases caused by morbid Vata)
9. When Udvartana is being done in Varsha Rutu (monsoon or rainy season - known to naturally disturb Vata)
10. When Udvartana is done in Jangala Desha (Dry land or desert land) or people belonging to Jangala Desha.

Powders for Udvartana- Kolakulattadi Churna, Kulatta churna, Kottamchukkadi Churna, Triphala Churna, Triphaladi churna - Triphala + licorice, Rock salt - Saindhava Lavana, Ishtika churnam (fine powder of brick), Besan powder - gram flour, Mocharasa churna - Powder of resin or extract of Bombax malabaricum (Shalmali - Silk cotton tree), Samudraphena - Powder of cuttlefish bone, Powder of Mocharasa and Samudraphena, Vasapatra swarasa (juice of Adathoda vasica leaves) and Shanka bhasma mixed together (Calx or ash of conch shell), Haritaki Valkala - Powder of bark of Terminalia chebula tree, Karpuradi churna - Mixture of powders of Karpura (camphor), Chandana (sandal wood), Lodhra (Symplocos racemosa), Shirisha (Albizzia lebbeck), Ushira (Vetiveria zizanioidis) and Nagakeshara (Mesua ferrea), Udvartana with paste of Babula patra (leaves of Acacia Arabica) followed by Udvartana with paste of Haritaki (Terminalia chebula), Paste of leaves of Jambu (Syzygium cumini), flowers of Arjuna (Terminalia arjuna) and Kushta (Saussurea lappa).

Syllabus- Snana- Types of different types of bath and Physiological effects of snana on body and mind.

Learning objectives- 1. Explain the physiological effects of Snana on body and mind and explain the reasons for contraindications of Snana.

Snana- Types Of Different Types of Bath and Physiological Effects of Snana on Body and Mind

(Ref- A.Hr.Su.2/16-18, Bha. Pra. 5, Su.Chi.24/57-62, Cha.Su.5/93-94, A.S.Su.3/40-43-45)

दौर्गन्ध्यं गौरवं तन्द्रां कण्डूं मलमरोचकम् ।
स्वेदबीभत्सतां हन्ति शरीरपरिमार्जनम् ॥
पवित्रं वृष्यमायुष्यं श्रमस्वेदमलापहम् ।
शरीरबलसन्धानं स्नानमोजस्करं परम् ॥

(च.सू. 5/93-94)

After doing massage, if one takes bath person

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cures the Daurgandha (bad odour), Gaurava (heaviness of body), Tandra (downiness), Kandu (itching), Mala (impurities), Arochaka (anorexia) and Sweda Bibhatsata (bad smell of sweat).

Bathing is Pavitra (purifying), Vrushya (aphrodisiac), Ayushya (life promoting), destroys the Shrama (fatigue), Sweda (sweat), Mala (dirt), Trishna (thirst), Daha (burning sensation), Papma (immorality), Sharira Bala Sandhana (bring about strength in body and compactness) and Ojuskara (enhancement of Ojas).

दीपनं वृष्य मायुष्यं स्नानमूर्जाबलप्रदम ।
कण्डूमलश्रमस्वेदतन्द्रातृऽदाहपाप्यजित ॥
(अ.ह्र.सू. 2/16, भा.प्र. 5)

निद्रादाहश्रमहरं स्वेदकण्डूतृषापहम् ।
ह्रद्यं मलहरं श्रेष्ठं सर्वेन्द्रियविबोधनम् ॥
(सु.चि. 24/57)

Bathing improves digestion (Dipana), Vrushya (acts as aphrodisiac), Ayushya (prolongs life), increases Urja Balapradama (enthusiasm and strength). It helps to get rid of Kandu (itching), Mala (dirt/waste products), Shrama (exertion), Sweda (sweat), Tandra (tiredness/fatigue), Trishna (excessive thirst), Daha (burning sensation) and Papamajita (Papa Roga cures).

Ushna Shita Snana (effect of cold and hot water bath)

उष्णाम्बुनाऽधःकायस्य परिषेको बलावहः ।
तेनैव चोत्तमाऽगस्य बलहृत्क्लेश चक्षुणाम ॥
(यो.र. 74, अ.ह्र.सू. 2/17)

शीतेन पयसा स्नानं रक्तपित्त प्रशान्तिकृत ।
तदेवोष्णेन तोयेन बल्यं वातकफापहम ॥
शिरः स्नानमचक्षुष्यमत्युष्णेनाम्बुना सदा ।
वातश्लेष्मप्रकोपे हितं तच्च प्रकिर्तितम ॥
(यो.र.73, भा.प्र. 5)

Hot water on 'Adhokaya' below the neck improves body strength and hot water bath on head leads to loss of strength of kesha (hair) and Chakshu (eyes).

Cold water bath cures the Raktapitta (bleeding disorder), hot water bath excluding head enhances Bala (strength) and destroys Vata and Kapha.

Contraindication for Snana

स्नानमर्दितनेत्रस्त्रकर्णरोगातिसारिषु ।
आध्मानपीनसाजीर्ण भुक्तवत्सु च गर्हितम ॥
(अ.ह्र.सू. 2/18)

स्नानं ज्वरऽतिसारे च नेत्रकर्णानिलार्तिषु ।
आध्मानपीनसाजीर्णभुक्तवस्तु च गर्हितम् ॥
(भा.प्र. 5)

तच्चातिसारज्वरितकर्णशूलानिलार्तिषु ।
आध्मानारोचकाजीर्णभुक्तवत्सु च गर्हितम् ॥
(सु.चि. 24/62)

Bath is contraindicated for those suffering from Ardita, diseases of Netra (eyes), Mukha (mouth), Karna (ears), Atisara (diarrhoea), Adhamana (flatulence), Jwara (fever), Pinasa (nasal discharge), Ajirna (indigestion) and immediately after food.

If Pitta Prakruti person and Pitta Vikara patient better to use cold water rather than hot water. If Kapha and Vata Prakruti person and Vata, Kapha Vikara better to use hot water rather than cold water.

For young children and old age people, hot water is good, for youngsters cold water is good, the students, dedicate time for studies, with limited sleeping hours and increased alertness, cold water bath early in the morning is beneficial. Hot water during winter season and cold-water bath in summer is good. If bath in the morning, cold water is good, but bath at night, after a tired, hot water bath is good.

Snana plays an important role in maintaining health. It's also a part of customs and rituals in Indian tradition. It is an act of purification not only for physical body but also for the mind. It is also necessary for internal purification. Bathing is not only required for the cleanliness of skin but also for its action on the internal organs as it helps to regulate proper circulation. It is one of the preventive modalities for maintaining the overall health of the individual.

When Vata and Kapha doshas are get vitiated lukewarm water can be used for head bath. Otherwise taking a head bath with hot water is injurious to the eyes and cold water is good for the

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eyes. Hot water applied to the head weakens the strength of sense organs. Snana has a promotive, protective and curative and positive effect on the body. Hence, it must be practised as a prophylactic measure to attain its benefits and maintaining health.

Syllabus-. Importance and benefits of Anulepana. Merits and demerits of present-day applications like face powder, face pack, balm, lotions, lipsticks, deodorants and perfumes etc. Importance of proper clothing (Vastradharana) in social life.

Learning objectives-

1. Explain the importance and benefits of Anulepana.
2. Describe the merits and demerits of present-day applications like face powder, face pack, balm, lotions, lipsticks, deodorants and perfumes.
3. Explain the importance of proper clothing (vastradharana) in social life.

Importance and Benefits of Anulepana

(Ref- Su. Chi.24/63-65 Bha. Pra. 5, A.H. Su 22/19-22)

सौभाग्यदं वर्णकरं प्रीत्योजोबलवर्धनम्।
स्वेददौर्गन्ध्यवैवर्ण्यश्रमघ्नमनुलेपनम् ॥
(सु.चि. 24/63)

Applying cosmetic powder, paste, oil etc. Which are fragrant on the body is Saubhyagya (auspicious), Varnakara (increases complexion), Priya (affection), Ojas, Bala Vardhana (strength), removes Sweda (sweat) and Daurgandhya (bad odour), Vaivarnya (discoloration), Shrama (tiredness).

स्नानं येषांनिषिद्धं तु तेषामप्यनुलेपन।
(सु.चि. 24/64)

Applying powder is also contraindication to those baths is contraindicated.

Mukhalepana (Applying Cosmetics)

मुखालेपाद्दृढं चक्षुः पीनगण्डं तथाऽऽननम्।
अव्यङ्गपिडकं कान्तं भवत्यम्बुज सन्निभम्॥
(सु.चि. 24/65-66)

Apply cosmetic powder on face gives strength to Mukha (face), Chakshu (eye), fullness and prominence to Pinaganda (checks and face), Avyanga (make face free of colour patches and eruptions) and increase Kanti of face like, lotus flower.

Application of Mukhalepa as per the six seasons

कोलमज्जा वृषान्मूलं शाबरं गौरसर्षपाः।
सिंहीमूलं तिलाः कृष्णा दार्वीत्वङ्निस्तुषा यवाः॥
दर्भमूलहिमोशीरशिरीषमिशितण्डुला।
कुमुदोत्पलकह्लारदूर्वामधुकचन्दनम्॥
कालीयकतिलोशीरमांसीतगरपद्मकम्।
तालीसगुन्द्रापुण्ड्राह्वयष्टीकाशनतागुरु॥
इत्यर्द्धार्द्धोदिता लेपा हेमन्तादिषु षट् स्मृताः।
(अ.ह.सु. 22/19-22)

- Hemant Rutu Kola Majja, Vrushamula, Shabara and Gaura Sarshapa.
- Shishira Rutu- Simhimula, Krishna Tila, Darvi Twaka and Nistusha Yava.
- Vasanta Rutu- Darbha Mula, Hima, Ushira, Shirisha, Mishi and Tandula.
- Grishma Rutu- Kumuda, Utpala, Karhara, Durva, Madhuka and Chandana.
- Varsha Rutu- Kaliyaka, Tila, Ushira, Mamsi, Tagara and Padmaka.
- Sharada Rutu-Talisa, Gundra, Pundraha, Yashtimadhu, Kasha, Nata and Agaru.

Merits and Demerits of Present-Day Applications Like Face Powder, Face Pack, Balm, Lotions, Lipsticks, Deodorants And Perfumes Etc.

Cosmetics are utilized to upgrade appearance. Makeup has been around for a long time. The primary known individuals who utilized cosmetics to upgrade their beauty were the Egyptians. Makeup those days was simply basic eye shading or some material for the body. Presently a-days makeup assumes an imperative job for the two men and women. Cosmetics are promptly accessible today

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as creams, lipstick, scents, eye shadows, nail shines, hair showers and so forth. Different cosmetics like face powder offer gleam to the skin subsequent to applying the base cream. A cosmetic item is characterized as 'A substance or readiness planned for placement in contact with any outer piece of the human body' (this incorporates the mouth and teeth). We use cosmetics to wash down, fragrance, secure and change the presence of our bodies or to modify its smells.

- Skin Creams is considered pharmaceutical products as even cosmetic creams are based on techniques developed by pharmacy and un-medicated creams are highly used in a variety of skin conditions in ancient times, creams were simply prepared by mixing of two or more ingredients using water as the solvent. With the advancement in innovation, more up to date techniques are utilized for definition of creams.
- Lips makeup: Lipstick, lip gloss, lip liner, lip plumper, lip balm, lip stain, lip conditioner, lip primer, lip boosters, and lip butters. Lipsticks are intended to add colour and texture to the lips and often come in a wide range of colours, as well as finishes such as matte, satin, gloss and lustre. Lip stains have a water or gel base and may contain alcohol to help the product stay on leaving a matte look.
- Lip balms are most often used to moisturize, tint, and protect the lips. Some brands contain sunscreen. Using a priming lip product such as lip balm or Chapstick can prevent chapped lips.
- Primers: Primers are so beloved by experts because they can do so much more than just make foundation go on smoother. Primers are sort of like insurance for makeup. Despite the fact that they regularly wear numerous capssmoothing, disguising, securing and preparing their primary jobs are to keep makeup on longer and give skin a smooth, faultless completion.
- Concealer covers imperfections of the skin. Concealer is often used for any extra coverage needed to cover acne/pimple blemishes, undereye circles, and other imperfections. Concealer is frequently thicker and more-strong than establishment, and gives longer enduring, progressively nitty gritty inclusion just as making a crisp clean base for the remainder of the makeup.
- Foundation is utilized to smooth out the face by covering spots, skin break out, flaws, or uneven skin tone. These are sold in a fluid, cream, or powder, or more as of late in a mousse. Foundation gives sheer, matte, dewy or full inclusion.
- Face powder sets the foundation and under eye concealer, giving it a matte completion while additionally disguising little imperfections or flaws. It can likewise be utilized to prepare the foundation, with the goal that it remains on longer and make a matte completion.
- Bronzer gives skin a bit of colour and contours the face for a sharper definition or creates a tan-look. Bronzer is considered to be more of a natural look and can be used for everyday wear. Bronzer enhances the colour of the face. It comes in either matte, semi-matte/satin, or shimmer finishes.
- Eye shadow is a pigmented powder/cream or substance used to emphasize the eye territory, customarily on, above, and under the eyelids. Numerous colours might be utilized without a moment's delay and mixed together to make distinctive impacts utilizing a mixing brush.
- Eye liner is utilized to improve and extend the clear size or profundity of the eye. For instance, white eyeliner on the waterline and inward corners of the eye makes the eyes look greater and more wakeful. It can come as a pencil, a gel, or a fluid and can be found in practically any colour.
- Nail polish is utilized to colour the fingernails and toenails.
- Cleansers or frothing washes are utilized to evacuate abundance earth, oil, and makeup left on the skin.
- Moisturizers are creams or lotions that hydrate the skin and help to retain moisture, they

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may contain essential oils, herbal extracts, or chemicals to assist with oil control or reducing irritation.

- Soaps composed of long chain fatty acid alkali salts with a pH of between 9 and 10. Utilization of cleanser with high pH causes an expansion in skin pH, which thus causes an increment in dehydrative impact, fractiousness and adjustment in bacterial flora.
- Shampoos are used primarily to clean the scalp of dirt and other environmental pollutants, sebum, sweat, desquamated corneocytes (scales), and other greasy residues including previously applied hair care products such as oils, lotions and sprays.
- Conditioners are used to decrease friction, detangle the hair, minimize frizz and improve combability. Conditioners act by neutralizing the electrical negative charge of the hair fiber by including positive charges and by greasing up the fingernail skin that decreases fiber hydrophilicity.
- Deodorant is one of the most commonly used cosmetic products, with millions of consumers applying these products to their axilla every day. Deodorants are utilized to veil odour; while, antiperspirants are utilized to lessen the measure of perspiration created.

Importance of Proper Clothing (Vastradharana) in Social Life

(Ref- Su.Chi.24/64, A.S.Su.3/43, Bha. Pra. Pu. Kha. 5, Cha.Su.5/95 Y.R. Dinacharya 80)

कौशेयं चित्रवस्त्रं च रक्तवस्त्रं तथैव च।
वातश्लेष्महरं शीतकाले तत्तु विधारयेत॥
(यो.र. 80, भा.प्र. 5)

रक्षोघ्नमथ चौजस्यं सौभाग्यकरमुत्तमम्।
सुमनोऽम्बरत्नानां धारणं प्रीतिवर्धनम्॥
(सु.चि. 24/64)

In cold season one should wear 'Kausheya' i.e. warm clothes, which are multi coloured and red coloured dresses, as there pacify Vata and Kapha Doshas. Wearing dress and ornaments which like by the person, dispels, evil, enhances vitality, best to bestow auspiciousness and increases affection (love).

Role of clean dress in life

काम्यं यशस्यमायुष्यमलक्ष्मीघ्नं प्रहर्षणम्।
श्रीमत् पारिषदं शस्तं निर्मलाम्बरधारणम्॥
(च.सू. 5/95)

वासःशृंगाररत्नानां धारणं प्रीतिवर्धकम।
रक्षोघ्नमर्थ्यमोजस्यं सौभाग्यकरमुत्तमम॥
(भा.प्र. 5)

Wearing clean cloth enhances bodily Charm, reputation, longevity and prevents inauspiciousness. It brings about pleasure, grace competence to participate in conferences and good look.

मेध्यं सुशीतं पित्तघ्नं काषायं वस्त्रमुच्यते।
तद्धारयेदुष्णकाले तच्चापि लघु शस्यते॥
(यो.र. 81, भा.प्र. 5)

In hot season, one should wear decoction or 'Kashaya' coloured clothes, (saffron or orange coloured), which are said to be 'Medhya' i.e. improves intelligence, Sheetala (cold) and Pitta Shamana. Even in decoction colour lighter one is superior.

शुक्लं तु शुभदं वस्त्रं शीतातपनिवारणम।
न चोष्णं न च वा शीतं तच्च वर्षासु धारयेत॥
(यो.र. 82, भा.प्र. 5)

In Varsha Kala i.e., rainy season one should wear Shukla i.e., white coloured. Which is auspicious, cold and protects from sun rays as the white cloth is neither hot nor cold.

The effects of new clean cloths

यशस्यं काम्यमायुष्यं श्रीदानन्दावर्धनम।
त्वच्यं वशीकरं रुच्यं नवं निर्मलाम्बरम॥
(यो.र. 83, भा.प्र. 5)

Wearing new and neat cloths ensures Yasha (fame), Kamya (fulfils desire) and Ayushya (promotes life span), Shree (money), Anada (happiness) and is Twachya (beneficial to skin), Vashikara (attracts attention of people), Ruchya (increase taste).

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The effect of dirty cloths

कदापि न जनैः सद्भिर्धार्यं मलिनम्बरम ।
तत्तु कण्डूक्रिमिरं ग्लान्यलक्ष्मीकरं परम ॥
(यो.र., भा.प्र. 5)

One should never wear dirty and unwanted cloths as there may cause Kandu (itching), Krimi (parasites), Glani (sickness), Alakshmikara (poverty and is inauspicious).

Seasonal Lepa external application

कुङ्कुमं चन्दनं चापि कृष्णागुरुविमिश्रितम ।
उष्णं वातकफध्वंसि शीते काले तदस्यते ॥
(यो.र. 85, भा.प्र. 5)

In cold seasons, the application of Lepa made from Kunkuma, Candana, Krishna Agaru is Ushna and relieves Vata and Kapha Doshas, and therefore it is useful in cold seasons.

Chandanadi Lepa

चन्दनं घनसारेण वालकेन न मिश्रितम ।
सुगन्धि परमं शीतमुष्णकाले प्रशस्यते ॥
(यो.र. 86, भा.प्र. 5)

Pralepa or cream prepared with combination of Candana, Karpura should be used in summer season.

चन्दनं घुसृणोपेतं मृगनाभिसमायुतम ।
न चोष्णं न च शीतं वा वर्षाकाले तदिष्यते ॥
(यो.र. 87, भा.प्र. 5)

The Pralepa prepared from Candana, Kesara and Mruganabhi is good in rainy season as it is neither Ushna nor Sheeta.

The effects of Pralepa

अनुलेपस्तृषामूर्च्छादुर्गन्ध्यश्रमदाहजित ।
सौभाग्यतेजस्त्वग्वर्णकान्त्योजोबलवर्धनः ।
(यो.र. 88, भा.प्र. 5)

The general effects of application of Pralepa are it relieves Trishna (Thirst), Murccha (fainting), Durgandha (foul smell), Shrama (tiredness) and Daha (burning sensation) and it improves Saubhagya (bestows prosperity), Teja (brilliance), Twaka Varna (good colour), Kanti (lustre), Ojus Vardhana and Bala Vardhana (increase the strength).

Contraindication for Pralepa

स्नानानर्हस्य लोकस्य त्वनुलेपोऽपि नो हितः ॥
(यो.र. 88, भा.प्र. 5)

The person who is not eligible for Snana is also not eligible for the Pralepa.

Use of fragrances

वृष्यं सौगन्ध्यमायुष्यं काम्यं पुष्टिबलप्रदम् ।
सौमनस्यमलक्ष्मीघ्नं गन्धमाल्यनिषेवणम् ॥
(च.सू. 5/96)

Uses of Gandha (scents) and Malya (garlands) stimulates Vrushyata (libido), Saugandhya (produces good smell in the body), Ayushya (enhances longevity) and Kamya (charm), Pushtibalaprada (gives nourishment and strength to the body), Saumanasya (pleasing to the mind) and Alakshmighna (prevents inauspicious).

MCQ On Dinacharya

1. The healthy person should get up at _____ मुहुर्त
   A) ब्राम्ह B) इंद्र
   C) शुभ D) अशुभ
2. For the cleaning of teeth, person should use the twigs of astringent, pungent and _____ in taste.
   A) Sweet B) Sour
   C) Bitter D) Salty
3. _____ is good for the eyes, so it should be used daily.
   A) Sauvirajana B) Anjana
   C) Rasanjana D) All of these
4. _____ is unsuitable for those suffering from wounds, bleeding diseases, dryness and redness of the eyes, poisoning, unconsciousness, intoxication and emaciation.
   A) Sweet B) Salt
   C) Tambula Sevana D) Dantadhavana
5. _____ should be avoided by person suffering from aggravation of kapha, who have undergone purificatory therapies and who are suffering from indigestion.
   A) Tambula B) Abhyanga
   C) Dantadhavana D) Snana

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6. ____कर्मसामर्थ्यं दीप्तोऽग्निर्मेदसः क्षयः ।
A) गुरुणः B) लाघवं
C) दृष्टीप्रसादं D) उद्वर्तनं

7. _____ should be avoided by person suffering from diseases of Vata and Pitta, children, the aged and those having indigestion.
A) Abhyanga B) Vyayama
C) Udvartana D) Dantadhavana

8. One should not sneeze, laugh or yawn without covering his _____.
A) Mouth B) Clothes
C) Body parts D) All of these

9. _____rasa should be avoided for Dantadhavana
A) Katu B) Madhura
C) Tikta D) Kashaya

10. _____should be applied once a week in eyes.
A) Sauviranjana B) Rasanjana
C) Anutaila D) All of these

11. Brahma muhurta can be considered as
A) Second half of the fourth yama, beginning of the 14th muhurta
B) Second half of the third yama, end of the 14th muhurta
C) Second half of the second yama, beginning of the12th muhurta
D) Second half of the seventh yama, end of the 12th muhurta

12. One muhurta is of
A) 48 min B) 45 min
C) 44 min D) 46 min

13. Which is the ODD one out
A) Patola B) Sarkara
C) Godhuma D) Dadhi

14. The herbal tooth brushes are of
A) 12 angulas in length, diameter of the tip of little finger
B) 10 angulas in length, diameter of the tip of middle finger
C) 12 angulas in length, diameter of the tip of index finger
D) 10 angulas in length, diameter of the tip of little finger

15. Vagabhata disapproves the use of rasa for Danthadhavana
A) Madhura, amla, lavana
B) Madhura, katu, Kashaya
C) Amla, katu, tikta
D) Amla, Kashaya, madhura

16. Drugs mentioned for Dantadhavana in Astanga Hrdaya does NOT include
A) Arka B) Nyagrodha
C) Kakubha D) Nimba

17. Drugs mentioned for Dantadhavana in Astanga Hrdaya includes
A) Arka B) Khadira
C) Karanja D) All the above

18. The length of Tooth brush is prescribed to
A) 12 angula B) 10 angula
C) 6 angula D) 8 angula

19. The length of tongue cleaner is prescribed as
A) 12 angula B) 10 angula
C) 6 angula D) 8 angula

20 The Rasa contraindicated for Tooth brushing twigs according to Vagbhata)
A) Madura, Amla, Lavana
B) Lavana, Katu, Tikta
C) Kashaya, Amla, Tikta
D) Madhura, Katu, Kashaya

21. Dantadhavana is contraindicated in the following Except
A) Svasa B) Hrudaroga
C) Udavarta D) Shiroroga

22. Dantadhavana is contraindicated in
A) Ajirna B) Netraroga
C) Ardita D) All the above

23. The drugs NOT recommended for Dantadhavana include
A) Nirgundi B) Palasa
C) Sigru D) Bilwa
E) All the above

24. The composition of Sauviranjanam is
A) Antimony sulphide
B) Antimony chloride
C) Antimony fluoride
D) Antimony bromide

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25. Rasanjana is to be administered
A) Daily B) Once a week
C) Once in 3 days D) Once in 8 days

26. Dhoomapana and Tambula charvana are contraindicated in
A) Kshata and mada
B) Visa and Netraroga
C) Murcha and visa
D) Ajirna and Sosa

27. Abhyanga should be particularly done in
A) Head, ears, soles
B) Head, trunk, sole
C) Head, ears, palms
D) Head, palms, soles

28. Eyes and skin are benefited by
A) Abhyangam and Nasya
B) Abhyangam and udvartanam
C) Udvartanam and Nasya
D) All the above

29. Agnideepthi is obtained by
A) Vyayama and Snana
B) Abhyangam and vyayama
C) Abhyangm and udvartanam
D) Snana m and udvartanam

30. Vyayama can be daily done by
A) Those who consume Snigdha Bhojana
B) Those in state of ajirna
C) Those who are aged
D) In case of Vata Pitta vitiation

31. Body massage should be done after
A) Vyayama B) Udvartanam
C) Snanam D) Pratimarsa nasya

32. The Rutu in which Vyayama is to be done with half strength
A) Hemanta, Shishira, vasanta
B) Sharad, vasanta, Shishira
C) Hemanta, Sharad, Shishira
D) Varsha, Sharad, vasanta

33. Which is wrong statement regarding Vyayama
A) Vyayama renders lightness to body
B) Vyayama to be done upto Ardhosakthi
C) Vyayama stimulate Agni
D) Body to be managed prior to Vyayama

34. According to which Acharya, Vyayama can be done in all seasons
A) Vagbhata B) Charaka
C) Kashyapa D) Susruta

35. According to Vagbhata the complications of Ativyayama are
A) Ksata and mada B) Klama and sosa
C) Kasa and chardi D) Murcha and svasa

36. गजं सिंह इवाकर्षन् भजन्ति विनश्यति Corresponds to overindulgence in the following
A) Vyayama and Udvartanam
B) Dhoopanam and Vyayama
C) Vyayama and Ratrijagarana
D) Dhoompanam and Snigdha bhojana

37. Bath with Usna jala on Adhakaya confers
A) Strength B) Wisdom
C) Longlife D) Freshness

38. Snana and Dantadhavana are contraindicated in
A) Asyaroga and Netraroga
B) Atisara and kasa
C) Atisara and vamana
D) Adhmana and siroroga

39. Which of the following heavy preparations are not to be taken after having food
A) Pistamaya B) Tandula
C) Prithuka D) All the above
E) None of the above

40. The Dravya is not recommended as a daily routine purpose are
A) Shali, Sashtika Dhanya
B) Mudga, Saindhava Lavana, Amalaki
C) Yava, Antariksa Udaka
D) Matsya, Dadhi, Masha, Yavaka

41. Find out the Anabhyasa Dravya
A) Valluram, Suksha Shaka
B) Bisanala, krisa Mamsa
C) Kurcika, kilata, Saukara Mamsa
D) Gavya Mamsa, Mahisha Mamsa
E) All the above

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42. Find out the wrong in the following
A) Sauviranjana should be used daily
B) Rasanjana should be used once in 5 or 8 days
C) Tikshna Anjana should be applied in day time
D) Tikshna Anjana should not be applied in day time.

43. Length of Dhumapana Varti
A) 28 Angula B) 18 Angula
C) 80 Angula D) 8 Angula

44. The shape of Dhumapana Varti resembles with
A) Yava B) Gunja
C) Godhuma
D) None of the above

45. Number of Dhumapana Kala (time) are
A) 8 B)18
C) 3 D)2

46. Dhumapana Vidhi can prevent
A) Vata Kaphaja Roga C) Sirogata Roga
B) Jatrurdhavagata Roga D) All the above

47. Dhumapana should be advised after
A) Snana (Bath), Ahara (meals)
B) Vomiting, sneezing
C) Tooth brushing, snuffing
D) Anjana, Nidra
E) All the above

48. Utklesha of Vata and Shleshma can be notice after
A) Bath, meals
B) Vomiting, Sneezing
C) Tooth brushing, snuffing
D) Anjana, Nidra
E) All the above

49. Prayogika Dhumapana should be performed
A) Once a day B) Twice a day
C) Four times in a day
D) Three times in a day

50. Sirovirechana Dhumapana should be advised
A) Once a day B) Twice a day
C) Thrice or four times in a day
D) Five or six times per day

51. Complication of excessive or untimely Dhumapana
A) Badhiryam
B) Andhatvam
C) Mukatvam, Sirobhrama
D) Raktapitta
E) All the above

52. Find out the false in case of Dhumanetra length
A) Prayogika Dhuma Netra is 34 Angula
B) Snaihika Dhuma Netra is 32 Angula
C) Sirovirecana Dhuma Netra is 24 Angula
D) Sirovirechana Dhuma Netra is 36 Angula

53. Anu Taila Nasya should be advised in
A) Pravrit Rutu B) Sarad Rutu
C) Hemanta Rutu D) All the above

54. Jiryatascottamange Cha Jara Na Labhate Balam' can be achieved by
A) Dhumapana B) Snana
C) Anutaila nasya D) All the above

55. Number of Taila Avartitas used to prepare Anu Taila
A) 2 Avartitas B) 5 Avartitas
C) 10 Avartitas D) 20 Avartitas

56. Dose of Anutaila for Nasya Karma purpose
A) Six drops B) Ardha Pala
C) One Pala D)1/4 th part of Pala

57. Anu Taila is indicated in
A) Manyastambha, Hnugraha
B) Sirah Shula, Ardita Vata
C) Pinasa, Ardhavabhedaka
D) All the above

58. Which of the following are used as Danta Kashta
A) Karanja, Karavira B) Arka, Malati
C) Kakubha, Asana D) All the above

59. Karna Tarpanam can prevent
A) Manyasthmbha B) Hanu graha
C) Badhiryam D) All the above

60. Padabhyanga can prevent
A) Gridrasi Vata B) Pakshaghata
C) Ardita Vata D) None of the above

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61. Dristi Prasada is due to
A) Padabhyanga B) Karna tarpana
C) Udvartana D) Murdnitaila

62. The Snehabhyanga person is least affected by
A) Jara B) Abhighata
C) Jara and Abhighata
D) None of the above

63. Which of the following is Chakshusya
A) Chatra Dharana
B) Padaraksha Dharana
C) Danda Dharana
D) None of the above

Answers of MCQ on Dinacharya

1. A	15. A	29. A	43. D	57. D
2. C	16. D	30. A	44. A	58. D
3. A	17. D	31. A	45. B	59. D
4. C	18. A	32. A	46. D	60. A
5. B	19. B	33. D	47. E	61. A
6. B	20. A	34. D	48. E	62. C
7. B	21. C	35. C	49. B	63. B
8. A	22. D	36. C	50. C	
9. B	23. E	37. A	51. E	
10. B	24. A	38. A	52. D	
11. A	25. B	39. E	53. D	
12. A	26. A	40. D	54. C	
13. D	27. A	41. E	55. C	
14. A	28. A	42. C	56. B	

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Chapter 3

Ratricharya

Syllabus

Ratri bhojanvidhi and its relation to health. Ratri shayana vidhi in relation to the proper time of sleep. Relation between Nidra and health. Effects of Yukta & Ayukta nidra. Effects of Ratri Jagarana, Diwaswapna, Anidra, Atinidra and Akala Nidra. Ahara and Vihara Causing sound sleep as well as disturbed sleep. Formulation of the duration of sleep according to age and Sleep in healthy and ailing persons.

Learning objectives

1. Describe ratri bhojanvidhi and its relation to health.
2. Describe ratri shayana vidhi in relation to the proper time of sleep.
3. Explain the relation between Nidra and health.
4. Describe effects of Yukta & Ayukta nidra.
5. Explain the effects of Ratri Jagarana, Diwaswapna, Anidra, Atinidra and Akala Nidra.
6. Identify Ahara and Vihara Causing sound sleep as well as disturbed sleep.
7. Formulate the duration of sleep according to age, Sleep in healthy and ailing persons.

Total - 7 hours (Lecture :06 hour, Non-lecture: 01 hours)

MCQ- Yes- SAQ (5 Marks)- Yes- LAQ (10 Marks)- No

Ratri Bhojanvidhi and its Relation to Health

Ratri Bhojana

रात्रौचभोजनंकुर्यात्प्रथमप्रहरान्तरे ।
किञ्चिदूनंसमश्नीयाद्दुर्जरम्तत्रवर्जयेत ॥

(भा.प्र. दिनचर्यादि प्रकरण 5)

Meals should be taken within the first Prahara (three hours) of the night be slightly less in quantity than the forenoon and devoid of things difficult for digestion.

Sandhyavarja Karma (action to be avoided in the evening time)

एतानिपञ्चकर्माणिसन्ध्यायांवर्जयेदबुधः ।
आहारंमैथुनंनिद्रांसंपाठंगतिमध्वनि ॥
भोजनाज्जायतेव्याधिमैथुनाग्दर्भविकृतिः ।
निद्रयानिःस्वतापाठादायुर्हानिर्गतेर्भयम् ॥

(भा.प्र. दिनचर्यादि प्रकरण 5)

Ahara (intake of food), Maithuna (sexual intercourse), Nidra (sleep), Sampatha (study) and Gati Adhva (walking long distance), these five activities should be avoided in the evening. Intake of food in evening produces Vyadhi (diseases), sexual intercourse leads to Garbha Vikruti (deformity in fetus), sleeping in evening to Niswata (loss wealth), reading leads to Ayu Nirgate (loss of life span) and long walk leads to Bhaya (fear).

Ratricharya (The regimen to be followed during night)

Jyotsna (moonlight)

ज्योत्स्नाशीतास्मरानन्दप्रदातृटपित्तदाहहत ।
ततोहीनगुणः कुर्यादवश्योऽनिलंकफम ॥
तमोभयावहंमोहदिऽमोहजनकंभवेत ।
पित्तहृत्कफहृत्कामवर्धनं क्ममकृच्चतत ॥

(भा.प्र. दिनचर्यादि प्रकरण 5)

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Jyotsna (moonlight) is cold in effects, it enhances sexual desire, mitigates thirst, Pitta and burning sensation. Mist of the night is slightly less effect than moon light, aggravates Vata and Kapha. Darkness gives rise to Bhaya (fear), Moha (delusion), confusion in recognizing directions, mitigates Kapha, enhances sexual desire causes exhaustion.

Bhojanottara Karma (Activities after taken food)

सायंभुक्त्वालघुहितंसमाहितमनाः शुचि ।
शास्तारमनुसंस्मृत्यस्वशय्यांचाथसंविशेथ ॥
देशेशुचावनाकिर्णेद्वित्राप्तप्रिचारकः ।
युक्तोपधानंस्वास्तीर्णंविस्तीर्णंविषमंसुखम ॥
जानुतुल्यंमृदुशुभंसेवेतशयनासनम ।
प्राग्दक्षिणशिराः पादावकुर्वाणोगुरुनप्रति ॥
पूर्वापरनिशाभागेधर्ममेवानुचिन्तयेत ॥

(अ.सं.सू. 3/55-56)

Food taken in night easily digestible and wholesome, one should go to bed, with absorbed mind, being clean and after praying gods, one should lie down on his own bed which is in a clean place without many persons and with only two or three trustworthy servants, bed should be with appropriate broad pillow, comfortable and not uneven. Bed and seat should be of the height of one's knee, soft and auspicious. One should sleep with head towards east or south and without directing the legs towards teachers or elders. One should always be engaged in Dharma during the first and last parts of night.

Ratri Shayana Vidhi in Relation to the proper time of Sleep Shayanavidhi According to Bhavamishra (Bha. Pra. Dinacharya)

भुक्तोपविशत स्तन्द्रा शयानस्य तु पुष्टता ।
आयुश्चक्रमाणस्य मृत्युर्धावति धावतः ॥
श्वासनष्टौ सम्मुत्तानस्तान द्विःपार्श्वे तु दक्षिणे ।
ततस्तद द्विगुणान्यामे पाश्चत्यष्याद्यथासुखम ॥

(भा.प्र. दिनचर्या प्रकरण)

Simply sitting after food produces stupor and sleeping lads to plumpiness of the body but short and slow walking leads to long life, run a person after meals cause the death.

After meals the person may lie down for a period of eight breathing with face up, for a period of twice that number on right side, for double that time on his left side, afterwards as found convenient.

वामादिशायामनलो नाभेरुध्वैऽपि जन्तूनाम ।
तस्मातु वामपार्श्वे शयीत भुक्तप्रपाकार्थम ॥
त्रिदोषशमनी खटवा तूली वातकफावहा ।
भूशय्या वृंहणी काष्ठपटटी तु वातला ॥
भूशय्या वातलाऽतीवरुक्षा पित्तास्त्रनाशिनी ।

(भा.प्र. दिनचर्या प्रकरण)

Agni is present on the left side, above the umbilicus; hence the person after taken meals should lie down on his left side for better digestion.

Sleeping on a cot mitigates all the three Doshas, on a swing mitigates Vata and Kapha, on the ground is stoutening the body and aphrodisiac and on wooden planks causes increase Vata, Dryness and mitigates the Pitta and Rakta.

सुशय्यारायनं हृद्यं पुष्टिनिद्राधृतिप्रदम ॥
श्रमानिलहरं वृष्यं विपरितमतोऽन्यथा ॥

(भा.प्र. दिनचर्या प्रकरण 188)

Sleeping on a comfortable bed is pleasing, nourishes the body, good sleep and stability, relives fatigue, aggravation of Vata and is aphrodisiac. Sleeping on uncomfortable bed result opposite to effects.

Relation Between Nidra And Health

According to Ayurveda, sleep is one of the important pillars (Upastambha Traya) which sustain life. Nidra is also important as Ahara (food). Again, it comes under unsurpassable urge (Adharniya Vega). If it is suppressed then it can cause headache, body pain, heaviness of eyes etc. Getting enough Nidra (sleep) at the right times supports wellbeing and good quality of life. Proper Nidra protects growth and development of body (Dhatu Pushti). Nidra helps to get proper learning capacity (Gyan). Again, Oja which is responsible for our body (immune system) also relies on sleep to stay healthy. Sleep deficiency can affect the body as tension may increase and emotional wellbeing may

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be affected. Ongoing sleep deficiency, which mainly occurs due to late night study, night duty of different professions, may raise risk for some chronic health problems. In Ayurvedic classic several diseases occur due to Nidra Viparyaya (improper sleep), Prajagaran (whole night awaking), Divaswapna (day sleep). One of the causes of Vatavyadhi is due to Nidra Viparyaya, in Ayurvedic classic Vatavyadhi gets prime importance and covers almost 50% of diseases. Some life style diseases like Madhumeha (Diabetes mellitus), Sthoulya (Obesity) etc. can occur due to improper sleep.

The relationship between sleep (Nidra) and health is a crucial one, as sleep plays a significant role in maintaining overall well-being and good health.

Restoration and Healing: During sleep, the body undergoes various processes that promote physical and mental healing. This includes tissue repair, muscle growth, and the release of hormones that regulate growth, stress, and appetite.

Immune Function: Adequate sleep is essential for a robust immune system. Lack of sleep can weaken the immune response, making the body more susceptible to infections and illnesses.

Mental Health: Sleep is closely linked to mental health. Insufficient sleep can contribute to mood disorders, such as depression and anxiety. It can also affect cognitive functions, including memory, decision-making, and problem-solving.

Weight Management: Poor sleep can disrupt the body's hormonal balance, leading to increased appetite and a preference for high-calorie, unhealthy foods. This can contribute to weight gain and obesity.

Cardiovascular Health: Chronic sleep deprivation is associated with an increased risk of heart disease, high blood pressure, and other cardiovascular issues.

Metabolic Health: Sleep is vital for regulating blood sugar levels and insulin sensitivity. Lack of sleep can increase the risk of type 2 diabetes.

Hormonal Balance: Sleep is crucial for maintaining a balance in hormones that control stress, growth, appetite, and other essential functions. Disruptions in sleep can lead to hormonal imbalances.

Chronic Diseases: There is evidence to suggest that inadequate sleep is linked to a higher risk of chronic conditions such as diabetes, obesity, and certain cancers.

Aging: Quality sleep is associated with longevity and healthy aging. It promotes the repair and maintenance of cells, tissues, and organs.

Pain Management: Sleep is known to help manage and reduce pain. Chronic pain conditions can be exacerbated by poor sleep quality.

Cognitive Performance: Adequate sleep is necessary for optimal cognitive performance. It enhances learning, memory consolidation, and problem-solving abilities.

Emotional Well-being: Sleep influences emotional regulation and resilience. Sleep deprivation can make individuals more susceptible to mood swings, irritability, and reduced emotional stability.

Effects of Yukta a Ayukta Nidra

निद्रायत्तं सुखं दुःखं पुष्टिः कार्श्यं बलाबलम्।
वृषता क्लीवता ज्ञानमज्ञानं जीवितं न च॥
अकालेऽतिप्रसङ्गाच्च न च निद्रा निषेविता।
सुखायुषी पराकुर्यात् कालरात्रिरिवापरा॥
सैव युक्ता पुनर्युङ्क्ते निद्रा देहं सुखायुषा।
पुरुषं योगिनं सिद्ध्या सत्या बुद्धिरिवागता॥
(च.सू 21/36-38, अ.स.सू. 9/31. अ.ह. सू. 7/53-55)

- Proper sleep provides Sukha (Happiness), Pushti (nourishment), Bala (strength), Vrushata (virility), Jnana (knowledge), and Jivana (life).
- Improper sleep causes Dukha (misery), Karshya (emaciation), Abala (weakness), Klibata (sterility), Ajnana (ignorance) and Marana (death).
- Person who desires long life should be indulge in Kala Nidra (sleep in proper time).
- Ati Prasanga (sleeping all the time), Na Cha Nidra (keeping awake) both these are like Kala

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Ratri (Yama). The proper sleep will provide long life span just similar to Yogi who gets the Satya Buddhi (perceiving the knowledge).

Types of Nidra

Acharya Charaka has classified Nidra in following manner according to causes-

तमोभवा श्लेष्मसमुद्भावाचमनः शरिरश्रमसंभवाच ।
आगन्तुकीव्याध्यनुवतिनीचरात्रिस्वभावप्रभवाचनिद्रा ॥
(च.सू. 21/58)

1. **Tamobhava-** caused by Tama.
2. **Sleshmasamudbhava-** caused by highly aggravated Kapha.
3. **Manah Sharira Srama Sambhava-** caused by physical and mental exhaustion.
4. **Agantuki**-indicative of bad prognosis leading imminent death.
5. **Vyadhi Anuvartini-** caused as a complication of other disease like Sannipataja Jwara etc.
6. **Ratri-Swabhava Prabhava-** caused by the very nature of the night.

Acharya alhana has classified Nidra into three types on the basis of Sushruta Samhita like-

Tamasi- When Sangyavaha Srotas become filled with Shlesma dominated by Tamoguna, Tamasi Nidra is produced.

Swabhaviki- this type of Nidra occurs naturally and daily in all living beings.

Vaikariki - if there is any disturbance in Mana and body, Nidra does not occur. But if Nidra is occurred, it is Vaikariki Nidra.

Acharya Charaka, Nidra is a condition in which Mana including Indriyas dissociates themselves from their objects. According to Acharya Sushruta Nidra is related to God Vishnu. Acharya Vagbhata has said that Nidra is produced from Tamas at the time of commencement of the creation. It is another form of Tamas itself and manifest when Tama is predominant, generally at night.

Effects of Ratri Jagarana, Diwaswapna, Anidra, Atinidra and Akala Nidra

Ratri Jagarana

रात्रौ जागरणं रूक्षं स्निग्धं प्रस्वपनं दिवा ।
अरुक्षमनभिष्यन्दि त्वासीनप्रचलायितम् ॥
(च.सू 21/50, अ.स.सू. 9/34. अ.ह. सू. 7/56)

Awakening during night causes Rukshata (roughness) in the body; sleep during daytime cause's Snigdhata (unctuousness) and sleeping in sitting posture is not causing Arukshata (neither roughness) Abhishyandi (nor unctuousness).

बहुमेदः कफाः स्वप्युः स्नेहनित्याश्च नाहनि ।
विषार्त्तः कण्ठरोगी च नैव जातु निशास्वपि ।
(अ.स.सू. 9/31)

Individuals having great accumulation of Meda (fat) and Kapha and those who take fatty foods daily, should not sleep during day; while those suffering from poisoning and diseases of the Kantha (throat) should not sleep even during night.

Divaswapna (Indication of Day Sleep)

गीताध्ययनमद्यस्त्रीकर्मभारध्वकर्शिताः ।
अजीर्णिनः क्षताः क्षीणावृद्धाबालास्तथाऽबलाः ॥
तृष्णातीसारशूलार्ताः श्वासिनोहिक्किनः कृशाः ।
पतिताभिहतोन्मताः क्लान्तायानप्रजागरैः ॥
क्रोधशोकभयक्लान्तादिवास्वप्नोचिताश्चये ।
सर्वएतेदिवास्वप्नंसेवेरनसार्वकालिकम ॥
(च.सू. 21/39-41)

For most, day sleep is contraindicated but sleeping during the day time can be prescribed for those who are exhausted by singing, study, alcoholic drinks, sexual acts, elimination therapy, carrying heavy weight, walking long distance; those suffering from phthisis, wasting diseases like tuberculosis, thirst, diarrhoea, colic pain, dyspnoea, hiccup, insanity, those who are too old, too young, weak and emaciated; those injured by fall and assault, those exhausted by journey by a vehicle, anger, grief and fear, and those who are accustomed to day sleep i.e. they are working in night.

Benefits of Divaswapna (Day sleep)

धातुसाम्यंतथा ह्येषां बलंचाप्युपजायते ।
श्लेष्मापुष्णातिचागानिस्थैर्यंभवतिचायुषः ॥

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ग्रीष्मेत्वादानरुक्षाणांवर्धमानेचमारुते ।
रात्रीणांचातिसंक्षेपाद्दिवास्वप्नः प्रशस्यते ॥
ग्रीष्मवर्षेषुकालेषुदिवास्वप्नात्प्रकुप्यतः ॥
श्लेष्मपित्तेदिवास्वप्नस्तस्मात्तेषुनशर्यते ॥

(च.सू. 21/42-44)

Equilibrium of Dhatus and strength are maintained and Kapha nourishes the organs and ensures longevity. In summer season, nights become shorter and Vata gets aggravated in the body due to the absorption of fluid (Adana Kala). Therefore, during this season, sleep during the daytime is prescribed for all.

Contra-indications of Divaswapna (day sleep)

मेदस्विनः स्नेहनित्याः श्लेष्मलाः श्लेष्मरोगिणः ।
दूषिविषार्ताश्छर्दिवानशयीरनकदाचन ॥
हलीमकः शिरःशूलंस्तैमित्यंगुरुगात्रता ।
अंगमर्दोऽग्निनाशश्चप्रलेपो हृद्यस्य च ॥
शोफोरोचकहृल्लासपीनसार्धावभेदकाः ।
कोठ्ठः पिडकाः कण्डूस्तन्द्राकासोगलामयः ॥
स्मृतिबुद्धिप्रमोहश्चसंरोधः स्त्रोतसांज्वरः ।
इन्द्रियाणासामर्थ्यंविषवेगप्रवर्तनम ॥
भवेत्नृणां दिवास्वप्नस्याहितस्यनिशेवणात ।
तस्माद्धिताहितंस्वप्नंबुद्ध्वास्वप्यातसुखंबुध् ॥

(च.सू. 21/45-49)

Divaswapna causes some of the diseases they are Halimaka (type of jaundice), Shira Shula (headache), Staimitya (stiffness and feeling as if body is covered by wet blanket), Guru Gatrata (heaviness of the body), Angamarda (body ache), Agninasha (loss of digestive power), Hridya Pralepa (a feeling as if adhered to the heart), Shopha (edema), Arochaka (anorexia), Hrillasa (nausea), Pinasa (rhinitis), Ardhavabhedaka (apin in one half of the head), Kotha (urticaria), Aru (eruption), Pidaka (abscess), Kandu (itching), Tandra (drowsiness), Kasa (coughing), Galamaya (diseases of the throat), Pramoha Smruti Buddhi (impairment of the memory and intelligence), Strotasam Samrodha (obstruction of the circulating channels of the body), Jwara (fever), Indriya Asamartha (weakness of sensory and motor organs) and Visha Vega Pravartanama (enhancement of the toxic effects of artificial poisons). So one should considering the Hita (merits) and Ahita (demerits) of sleep in various seasons and circumstances. So that it brings Sukha (happiness) and health to the individual.

Anidra

Causes of Anidtra (Insomnia)

कायस्य शिरसश्चैव विरेकश्छर्दनं भयम् ।
चिन्ता क्रोधस्तथा धूमो व्यायामो रक्तमोक्षणम् ॥
उपवासोऽसुखा शय्या सत्त्वौदार्यं तमोजयः ।
निद्राप्रसङ्गमहितं वारयन्ति समुत्थितम् ॥
एत एव च विज्ञेया निद्रानाशस्य हेतवः ।
कार्यं कालो विकारश्च प्रकृतिर्वायुरेव च ॥

(च.सू. 21/55-57)

Elimination of Doshas in excess from the body through purgation and emesis, Nasya, Bhaya (fear), Chinta (anxiety), Krodha (anger), Dhuma (smoking), Vyayama (excessive physical exercise), Rakta Mokshana (excess bloodletting/loss), Upavasa (fasting), Asukha Shayya (uncomfortable bed) Satvaudarya/ Satva Guna Bhuyishta (predominance of Satva) and Tamojaya/ Tamo Guna Jaya (suppression or overcome from Tamo Guna) are causes for insomnia.

The above-mentioned factors along with Karya/ Karyasakta (interested to work or naturally committed to work), Kala (old age), Vikara (due to pain in diseases), especially these due to the vitiation of Vata obstruct the sleep and induce sleeplessness.

निद्रानाशोऽनिलात् पित्तान्मनस्तापात् क्षयादपि ।
संभवत्यभिघाताच्च प्रत्यनीकैः प्रशाम्यति ॥

(सु.शा. 4/42)

Sleep is lost due to Vayu, Pitta, stress, wasting and trauma and is restored by the opposites.

Atinidra

Procedures/treatment to avoid Atinidra

निद्रातियोगे वमनं हितं संशोधनानि च ।
लङ्घनं रक्तमोक्षश्च मनोव्याकुलनानि च ॥

(सु.शा. 4/47)

In excessive sleep, evacuative measures particularly emesis, lightening, blood-letting and mind-agitating are useful.

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Bhuta Dhari /Good and bad sleep

रात्रिस्वभावप्रभवा मता या तां भूतधात्रीं प्रवदन्ति तज्ज्ञाः ।
तमोभवामाहुरधस्य मूलं शेषाः पुनर्व्याधिषु निर्दिशन्ति ॥
(च.सू. 21/59)

The sleep caused by the Ratri Swabhava Prabhava (nature of the night is the sleep) is excellence and is known as Bhutadhatri (that nurses all the living beings).

The sleep which occurs due to increases Tamas is the root cause for Agha/Papa (non-righteous deed or sinful acts). Other types of sleep are just like disease itself, hence they are grouped under Vyadhi (disease) and to be treated as diseases.

Role of sleep in obesity

देहवृत्तौ यथाऽऽहारस्तथा स्वप्नः सुखो मतः ।
स्वप्नाहारसमुत्थे च स्थौल्यकार्श्ये विशेषतः ॥
(च.सू. 21/51)

As like Ahara (proper diet), Swapna/ Nidra (proper sleep) is also essential for the Deha Vrutti (maintenance of the body). Sthoulya (obesity) and Karshya (emaciation) are specially caused by Swapna (sleep) and Ahara (food).

Day sleep and Rutu

ग्रीष्मवर्ज्येषु कालेषु दिवास्वप्नात् प्रकुप्यतः ।
श्लेष्मपित्ते दिवास्वप्नस्तस्मात्तेषु न शस्यते ॥
(च.सू 21/44)

Divaswapna is indicated in Grishma Rutu (summer season), as the nights become shorter and Vata gets aggravated in the body due to the Ruksha Guna of Adana Kala. Therefore, Divaswapna in seasons other than Grishma Rutu (summer season) is not advisable as it aggravates Kapha and Pitta.

Ahara and Vihara Causing Sound Sleep as Well as Disturbed Sleep

अभ्यगोत्सादनंस्नानंग्राम्यानूपौदकारसाः ।
शाल्यन्नं सदधि क्षीरं स्नेहोमद्यंमनः सुखम ॥
मनसोऽनुगुणागन्धाः शब्दाः संवाहनानिच ।
चक्षुष्योस्तर्पणंलेपः शिरसोवदनस्यच ॥
स्वास्तीर्णशयनंवेश्मसुखंकलस्तथोचितः ।
आनयन्त्यचिराश्निद्रां प्रनष्टा यानिमित्ततः ॥
(च.सू. 21/52-54)

Aharaja Hetu - Gramya, Anup, Varija Mamasa Rasa, Shalyanna, Shali with Dadhi, Ksheera, Madya, Sneha.

Viharaja Hetu - Abhyanga, Snana, Utsadana, Samvahana, Cakshusostaerpana, application of soothing pastes to the head, application of soothing pastes to the face, comfortable bed, sleep in proper time.

Manasika Hetu - pleasure of mind, indulging in odours and sound of once own taste. Person gets sleep immediately when the aetiologies of sleeplessness are removed.

Formulation of the Duration of Sleep According to Age and Sleep in Healthy and Ailing Persons

Sleep is a physiological phase of 'unawake' that exists between two phases of normal and routine awakening. It is a period of rest for the body and mind during which bodily functions are partially suspended and sensitivity to the external stimuli is diminished, but readily or easily regained.

After hours of working (physical or mental) our mind & body need rest, so that they are once again charged. But when we are dreaming during sleep our mind is still working, it isn't taking rest. That is why people who dream often are not feeling fresh (mind is not recharged) even after long hours of sleep, or they want to sleep more in the daytime. The quality of sleep is hampered due to dreams which in turn hamper our thinking/working process & thus quality of life in the long run.

Sleep requirements

During sleep the body gets repaired by itself and the brain processes the day's events and helps to sort them. Some sleep more and other sleep less, but both may be normal. The range of deviation of sleeping hours in the normal adult population is 4 to 10 hours per day. Although the infants and children sleep more while the old people sleep less. A normal adult can with stand several days up to 10 days of sleep deprivation without showing any remarkably gross changes.

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1. Newborn infants: 18 to 20 hours
2. Growing children: 12 to 14 hours
3. Adults: 7 to 9 hours
4. Old persons: 5 to 7 hours.

Syllabus- Various Aspects of Sleep like: a. Daytime Sleepiness and Alertness, b. Sleep Deprivation, c. Sleep and Host Defense, d. Master Circadian Clock and Master Circadian Rhythm, e. Human Circadian Timing System and Sleep-Wake Regulation, f. Circadian Rhythms in Sleepiness, Alertness, and Performance, g. Circadian Disorders of the Sleep-Wake Cycle. Sleep apnea, insomnia, narcolepsy and restless leg syndrome. Solutions to Asatmya jagarana (sleep disorders).

Learning objective-

1. Explain various Aspects of Sleep like: a. Daytime Sleepiness and Alertness b. Sleep Deprivation c. Sleep and Host Defense d. Master Circadian Clock and Master Circadian Rhythm e. Human Circadian Timing System and Sleep-Wake Regulation f. Circadian Rhythms in Sleepiness, Alertness, and Performance g. Circadian Disorders of the Sleep-Wake Cycle
2. Explain Sleep apnoea, insomnia, narcolepsy and restless leg syndrome. Explain solutions to Asatmya jagarana (sleep disorders).

Various Aspects of Sleep Like

A. Daytime Sleepiness And Alertness

Daytime Sleepiness - Daytime sleepiness refers to the feeling of drowsiness or an overwhelming urge to fall asleep during the daytime hours when a person is expected to be awake and alert. It can be a common and natural occurrence, especially in the afternoon when the body experiences a natural dip in energy. However, excessive or chronic daytime sleepiness can be indicative of underlying issues or sleep disorders. Excessive sleepiness during waking hours, also referred to as daytime somnolence, may be a warning sign of poor sleep quality, sleep disorders, or other health conditions. Though not a disorder in itself, excessive daytime sleepiness is something to take seriously. Excessive daytime sleepiness is defined as difficulty staying awake or alert, or an increased desire to sleep during the day. The feelings of sleepiness may be stronger when you are sedentary, such as while driving <https://www.sleepfoundation.org/drowsy-driving> or sitting at work. Although it is normal to feel sleepy once in a while after going short on sleep, repeated bouts of drowsiness are considered excessive daytime somnolence when this happens almost every day for at least three months.

Excessive daytime sleepiness is one of the most common sleep-related patient symptoms, and it affects an estimated 20 percent of the population. Persons with excessive daytime sleepiness are at risk of motor vehicle and work-related incidents, and have poorer health than comparable adults. The most common causes of excessive daytime sleepiness are sleep deprivation, obstructive sleep apnea, and sedating medications.

Other potential causes of excessive daytime sleepiness include certain medical and psychiatric conditions and sleep disorders, such as narcolepsy. Obstructive sleep apnea is a particularly significant cause of excessive daytime sleepiness. An estimated 26 to 32 percent of adults are at risk of or have obstructive sleep apnea, and the prevalence is expected to increase. The evaluation and management of excessive daytime sleepiness is based on the identification and treatment of underlying conditions (particularly obstructive sleep apnea), and the appropriate use of activating medications.

Alertness- Alertness refers to a state of being awake, attentive, and mentally sharp. It is characterized by an individual's ability to respond quickly and effectively to their environment, stay focused on tasks, and process information with clarity. Alertness is a critical aspect of human functioning, influencing various areas of life, including safety, productivity, and overall well-being.

Adequate Sleep: One of the most fundamental

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factors affecting alertness is the quality and quantity of sleep an individual gets. Insufficient or poor-quality sleep can lead to daytime sleepiness and reduced alertness.

Circadian Rhythms: The body's internal biological clock, known as the circadian rhythm, plays a significant role in regulating alertness. It influences the sleep-wake cycle and can affect alertness at different times of the day.

Stress Management: High levels of stress can lead to mental fatigue and reduced alertness. Effective stress management techniques, such as mindfulness and relaxation, can help improve alertness.

Physical Activity: Regular exercise and physical activity have been shown to enhance alertness and cognitive function. Physical movement increases blood flow and oxygen to the brain.

Diet and Hydration: Proper nutrition and hydration are essential for maintaining alertness. Balanced meals and adequate water intake can impact energy levels and cognitive performance.

Caffeine and Stimulants: Caffeine and other stimulants, found in coffee, tea, and some medications, can provide a temporary boost in alertness and wakefulness.

Napping: Short and well-timed naps can help combat sleepiness and enhance alertness, particularly in the afternoon.

Environmental Factors: Lighting, temperature, and noise in one's surroundings can influence alertness. Natural light exposure and a comfortable environment can promote wakefulness.

Mental Engagement: Engaging in stimulating mental activities, such as problem-solving, puzzles, or creative work, can help maintain alertness and cognitive acuity.

Medications and Medical Conditions: Some medications can affect alertness, either by promoting wakefulness or causing drowsiness. Certain medical conditions may also impact alertness and cognitive function.

Safety and Productivity: Alertness is vital in situations where safety is a concern, such as driving or operating machinery. It is also crucial for productivity in academic, professional, and daily life.

B. Sleep deprivation

Sleep deprivation, also known as sleep insufficiency or sleeplessness, is the condition of not having adequate duration and/or quality of sleep to support decent alertness, performance, and health. It can be either chronic or acute and may vary widely in severity.

Acute sleep deprivation is when an individual sleeps less than usual or does not sleep at all for a short period of time - normally lasting one to two days but tends to follow the sleepless pattern for longer with no outside factors in play. Chronic sleep deprivation means when an individual routinely sleeps less than an optimal amount for ideal functioning. Chronic sleep deficiency is often confused with the term insomnia. Although both chronic sleep deficiency and insomnia share decreased quantity and/or quality of sleep as well as impaired function, their difference lies in the ability to fall asleep. Sleep deprived individuals are able to fall asleep rapidly when allowed but those with insomnia have difficulty falling asleep.

The average adult needs seven or more hours of sleep per night to maintain health. The amount of sleep needed can depend on sleep quality, age, pregnancy, and level of sleep deprivation. Insufficient sleep has been linked to weight gain, high blood pressure, diabetes, depression, heart disease, and strokes. Sleep deprivation can also lead to high anxiety, irritability, erratic behaviour, poor cognitive functioning and performance, and psychotic episodes.

A chronic sleep-restricted state adversely affects the brain and cognitive function. However, in a subset of cases, sleep deprivation can paradoxically lead to increased energy and alertness; although its long-term consequences have never been evaluated, sleep deprivation has even been used as a treatment for depression.

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This condition can result from various factors, including lifestyle choices, work demands, medical conditions, or sleep disorders. Chronic sleep deprivation can have a significant impact on physical health, mental well-being, and overall functioning.

C. Sleep and Host Defense

Sleep plays a vital role in the body's host defense mechanisms, contributing to the proper functioning of the immune system. The relationship between sleep and host defense is complex and bidirectional, with sleep influencing the immune system, and the immune system affecting sleep. The immune system is affected by sleep and rest, and sleep deprivation is detrimental to immune function. Complex feedback loops involving cytokines, such as interleukin-1 and tumor necrosis factor-alpa produced in response to infection, appear to also play a role in the regulation of non-rapid eye movement (REM) sleep. Thus, the immune response to infection may result in changes to the sleep cycle, including an increase in slow-wave sleep relative to REM sleep.

In people with sleep deprivation, active immunizations may have a diminished effect and may result in lower antibody production, and a lower immune response, than would be noted in a well-rested individual. Additionally, proteins such as NFIL3, which have been shown to be closely intertwined with both T-cell differentiation and circadian rhythms, can be affected through the disturbance of natural light and dark cycles through instances of sleep deprivation. These disruptions can lead to an increase in chronic conditions such as heart disease, chronic pain, and asthma.

Immune Function: Cytokine Production: Sleep is associated with increased production and release of cytokines, which are essential for immune response regulation. Some cytokines, such as interleukin-1 (IL-1) and tumor necrosis factor-alpha (TNF-alpha), are involved in promoting sleep. They play a role in inflammation and immune system activation.

Immune Cell Activity: During deep sleep stages, the body experiences increased activity of immune cells, including T cells, which are critical for the body's defense against pathogens. These cells are involved in identifying and eliminating infected or abnormal cells.

Antibody Production: Sleep supports the production of antibodies, which are proteins that help the immune system recognize and neutralize pathogens, such as bacteria and viruses.

Regulation of Inflammation: Sleep helps regulate the body's inflammatory response. Adequate sleep can help prevent excessive inflammation, which is associated with chronic diseases and can impair the body's defense mechanisms.

Improved Wound Healing: Sleep promotes wound healing, as inflammation and tissue repair processes are closely linked.

Cortisol Regulation: Sleep helps regulate cortisol, a stress hormone. Chronic sleep deprivation can lead to elevated cortisol levels, which can suppress immune function and increase vulnerability to infections.

Circadian Regulation: The body's internal clock, known as the circadian rhythm, influences the timing of immune system functions. Sleep is one of the key components of maintaining a healthy circadian rhythm.

Memory Consolidation: During deep sleep stages, the brain consolidates memories, including those related to prior infections and immune responses. This can enhance the immune system's ability to respond to recurring pathogens.

Susceptibility to Infections: Chronic sleep deprivation can weaken the immune system and increase the risk of infections. People who consistently get inadequate sleep may be more susceptible to illnesses, such as the common cold and influenza.

D. Master Circadian Clock and Master Circadian Rhythm

Master Circadian Clock- The master circadian clock, often referred to simply as the "circadian clock," is a central regulatory system in the body that

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controls and coordinates the timing of various physiological and behavioral processes. This internal biological clock ensures that the body's functions are synchronized with the 24-hour day-night cycle. The master circadian clock is primarily governed by a region in the brain known as the suprachiasmatic nucleus (SCN), which is located in the hypothalamus.

1. Synchronization: The master circadian clock helps synchronize and harmonize the body's functions with environmental cues, especially the light-dark cycle. It regulates the body's internal timing to anticipate and adapt to daily changes in the environment.

2. Light Sensitivity: The SCN contains light-sensitive cells that detect changes in light levels, particularly in the blue light spectrum. Exposure to natural daylight in the morning and avoidance of artificial light at night are critical for entraining and regulating the circadian clock.

3. Control of Peripheral Clocks: While the master circadian clock is located in the brain, it communicates with peripheral clocks located in nearly every cell and tissue of the body. These peripheral clocks help regulate local processes, such as digestion, immune function, and cellular repair, in coordination with the master clock.

4. Circadian Rhythm: The master circadian clock operates on a roughly 24-hour cycle, but it may require external cues, such as light exposure and meal timing, to maintain this rhythm in alignment with the external environment.

5. Sleep-Wake Regulation: The circadian clock plays a crucial role in the regulation of the sleep-wake cycle. It signals the release of melatonin, a hormone that promotes sleep, in response to darkness, and the suppression of cortisol, a hormone that promotes wakefulness, in response to light.

6. Role in Health: A well-functioning master circadian clock is essential for overall health and well-being. Disruptions to the circadian clock, such as those caused by irregular sleep patterns, shift work, or frequent time zone changes, can lead to circadian misalignment, which is associated with various health problems, including sleep disorders, metabolic disturbances, and an increased risk of chronic diseases.

7. Circadian Rhythm Sleep Disorders: Certain sleep disorders, like delayed sleep phase disorder and advanced sleep phase disorder, are characterized by a misalignment between the master circadian clock and the desired sleep-wake schedule. These disorders can result in difficulties falling asleep and waking up at the desired times.

Master Circadian Rhythm- Master circadian rhythm, often referred to as the "central" or "master" clock, is a critical component of the body's internal biological timing system. It is responsible for regulating and synchronizing various physiological and behavioural processes to the 24-hour day-night cycle. The master circadian rhythm is primarily controlled by a region in the brain called the suprachiasmatic nucleus (SCN), located in the hypothalamus.

1. Light Sensitivity: The SCN contains light-sensitive cells that respond to changes in light levels, particularly in the blue light spectrum. Exposure to natural light in the morning and avoidance of artificial light at night help entrain and regulate the master circadian rhythm.

2. Synchronization: The master circadian rhythm is responsible for synchronizing various bodily functions, including the sleep-wake cycle, hormone production, body temperature, and metabolism. This synchronization helps the body anticipate and adapt to daily environmental changes.

3. Control of Peripheral Clocks: While the master circadian rhythm is located in the brain, it communicates with and controls peripheral clocks found in nearly every cell and tissue of the body. These peripheral clocks help regulate local processes, such as digestion, immune function, and cellular repair, in coordination with the master clock.

4. 24-Hour Cycle: The master circadian rhythm operates on an approximately 24-hour cycle, although it may need occasional environmental cues, such as

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light exposure and mealtimes, to remain synchronized with the external day-night cycle.

5. Role in Sleep-Wake Cycle: The master circadian rhythm plays a pivotal role in regulating the timing of sleep and wakefulness. It signals the release of melatonin, a hormone that promotes sleep, and the suppression of cortisol, a hormone that promotes wakefulness, in response to light and dark cues.

6. Impact on Health and Well-being: Disruptions to the master circadian rhythm, such as those caused by irregular sleep patterns, shift work, or frequent travel across time zones, can lead to circadian misalignment. This misalignment is associated with health issues, including sleep disorders, metabolic disturbances, and an increased risk of chronic diseases.

7. Circadian Rhythm Sleep Disorders: Conditions like delayed sleep phase disorder and advanced sleep phase disorder involve misalignment between the master circadian rhythm and the desired sleep-wake schedule. These disorders can lead to difficulties falling asleep and waking up at the desired times.

To maintain a healthy master circadian rhythm, it's important to adhere to a regular sleep schedule, optimize exposure to natural light, and practice good sleep hygiene.

E. Human Circadian Timing System and Sleep-wake Regulation

Human Circadian Timing System- The human circadian timing system is a complex biological system that regulates the body's internal clock and controls various physiological and behavioural processes on a roughly 24-hour cycle. This internal clock, driven by the suprachiasmatic nucleus (SCN) in the brain, helps the body anticipate and adapt to daily changes in the environment, especially the light-dark cycle.

1. Suprachiasmatic Nucleus (SCN): The SCN is often referred to as the "master clock" and is located in the hypothalamus of the brain. It contains specialized cells that are sensitive to changes in light. The SCN is responsible for maintaining the body's circadian rhythm by regulating various processes, including the sleep-wake cycle.

2. Light Sensitivity: The SCN is particularly sensitive to light, especially in the blue spectrum. Exposure to natural light, especially in the morning, helps entrain and reset the circadian clock, ensuring that it remains synchronized with the external day-night cycle.

3. Peripheral Clocks: The SCN communicates with peripheral clocks found in nearly every cell and tissue of the body. These peripheral clocks help regulate local processes, such as digestion, body temperature, hormone production, and immune function.

4. Circadian Rhythm: The circadian rhythm is a roughly 24-hour cycle of various bodily functions, including body temperature, hormone release, and sleep-wake patterns. It influences the timing of daily activities and processes.

5. Sleep-Wake Cycle: The circadian timing system plays a central role in regulating the sleep-wake cycle. It controls the release of melatonin, a hormone that promotes sleep, and the suppression of cortisol, a hormone that promotes wakefulness, in response to light and dark cues.

6. Circadian Misalignment: Disruptions to the circadian timing system can lead to circadian misalignment, where the internal clock is out of sync with the external environment. This can occur due to irregular sleep patterns, shift work, jet lag, or sleep disorders and can result in health issues and reduced well-being.

7. Health Implications: Maintaining a well-functioning circadian timing system is essential for overall health. Circadian misalignment is associated with various health problems, including sleep disorders, metabolic disturbances, mood disorders, and an increased risk of chronic diseases.

8. Circadian Rhythm Sleep Disorders: Certain sleep disorders, such as delayed sleep phase disorder, advanced sleep phase disorder, and shift work disorder, are characterized by a misalignment between the internal circadian clock and the desired sleep-wake schedule. These disorders can lead to difficulties falling asleep and waking up at the desired times.

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Sleep-Wake Regulation- Sleep-wake regulation is the process by which the body controls and maintains the sleep-wake cycle, ensuring that sleep and wakefulness occur at the appropriate times. This regulation is primarily governed by the body's internal circadian clock, which synchronizes with the 24-hour day-night cycle, and it involves complex interactions between various biological processes, including hormones and neurotransmitters.

1. Circadian Rhythm: The circadian rhythm is a 24-hour biological cycle that influences various physiological and behavioral processes, including the sleep-wake cycle. The circadian clock, driven by the suprachiasmatic nucleus (SCN) in the brain, helps the body anticipate and adapt to daily environmental changes, particularly light and darkness.

2. Melatonin: The hormone melatonin, produced by the pineal gland in response to darkness, plays a significant role in promoting sleep. Melatonin levels typically rise in the evening, signaling the body that it is time to prepare for sleep.

3. Cortisol: The hormone cortisol, often referred to as the "stress hormone," is responsible for promoting wakefulness. Cortisol levels are typically highest in the morning and gradually decrease throughout the day to encourage sleep.

4. Adenosine: Adenosine is a neurotransmitter that accumulates in the brain as a person remains awake. Higher levels of adenosine contribute to feelings of sleepiness and the drive to sleep. During sleep, adenosine levels decrease, allowing for wakefulness upon awakening.

5. Homeostatic Drive: The homeostatic drive for sleep is influenced by the body's need for rest, which accumulates over time during wakefulness. The longer a person remains awake, the stronger the drive for sleep becomes, leading to increased sleepiness.

6. Light Exposure: Exposure to natural light, particularly in the morning, helps entrain the circadian clock and promote wakefulness. Conversely, exposure to artificial light, especially in the evening, can disrupt the circadian rhythm and interfere with sleep-wake regulation.

7. Sleep Pressure: Sleep pressure refers to the buildup of sleep-inducing factors, such as adenosine, as a person remains awake. It contributes to the ability to fall asleep and stay asleep during the night.

8. Environmental Factors: Sleep-wake regulation can be influenced by environmental factors, including the sleep environment, noise, temperature, and daily routines.

9. Sleep-Wake Disorders: Various sleep disorders, such as insomnia, sleep apnea, and circadian rhythm sleep disorders, can disrupt the regulation of the sleep-wake cycle and lead to difficulties with sleep and wakefulness.

10. Lifestyle Choices: Factors like irregular sleep schedules, caffeine consumption, alcohol use, and shift work can impact sleep-wake regulation and overall sleep quality.

F. Circadian Rhythms In Sleepiness, Alertness, And Performance

Circadian rhythms play a significant role in regulating sleepiness, alertness, and cognitive performance. These rhythms are controlled by the body's internal biological clock, which is synchronized with the 24-hour day-night cycle. Circadian rhythms influence the timing of various physiological and cognitive functions, including those related to sleep and wakefulness.

1. Sleepiness:

- **Morning Sleepiness:** Circadian rhythms are responsible for the tendency to feel sleepier during the early morning hours. This is influenced by a natural drop in core body temperature and higher levels of the hormone melatonin, signalling that it's time to prepare for sleep.
- **Afternoon Slump:** In the afternoon, many people experience a temporary drop in alertness and increased sleepiness, often referred to as the "afternoon slump." This is influenced by circadian rhythms as well as homeostatic sleep pressure, which accumulates throughout the day.

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2. Alertness:

- **Morning Alertness:** As circadian rhythms align with the morning hours, alertness gradually improves as body temperature and cortisol levels rise. This results in increased wakefulness and cognitive alertness.
- **Evening Alertness:** In the evening, alertness tends to peak, as circadian rhythms promote wakefulness, higher body temperature, and lower melatonin levels. This is why many people feel more alert in the late afternoon and early evening.

3. Performance:

- **Cognitive Performance:** Circadian rhythms influence cognitive performance. Peak alertness and cognitive function typically occur in the late morning and early evening, while the afternoon and late night may be associated with reduced cognitive performance.
- **Physical Performance:** Circadian rhythms also affect physical performance, including strength, endurance, and coordination. Peak physical performance tends to occur in the late afternoon and early evening.
- **Shift Work and Performance:** For individuals engaged in shift work or those with disrupted circadian rhythms, performance can be affected, and they may experience decreased cognitive and physical abilities, as well as increased sleepiness.

G. Circadian Disorders of the Sleep-Wake Cycle. Sleep Apnea, Insomnia, Narcolepsy and Restless Leg Syndrome

Circadian Disorders of the Sleep-wake Cycle

- Circadian rhythm sleep-wake disorders (CRSWDs) are a group of sleep disorders characterized by disruptions in the natural 24-hour sleep-wake cycle, also known as the circadian rhythm. These disorders can affect a person's ability to fall asleep, stay asleep, and wake up at desired times.

1. Delayed Sleep Phase Disorder (DSPD): In DSPD, an individual's natural sleep-wake cycle is shifted to later times. People with DSPD typically have difficulty falling asleep and waking up in the morning, often leading to a delayed sleep schedule.

2. Advanced Sleep Phase Disorder (ASPD): In contrast to DSPD, individuals with ASPD experience an earlier-than-normal sleep-wake cycle. They may fall asleep very early in the evening and wake up very early in the morning. ASPD can interfere with social and work schedules.

3. Non-24-Hour Sleep-Wake Disorder: Non-24-hour sleep-wake disorder is most common in blind individuals. Without the light-dark cues that synchronize the circadian clock, their sleep-wake cycle gradually shifts out of sync with the 24-hour day. This leads to cyclic periods of insomnia and excessive sleepiness.

4. Irregular Sleep-Wake Rhythm: This disorder is characterized by multiple naps and irregular sleep episodes throughout a 24-hour period. It often affects individuals with neurological conditions, such as dementia or brain injuries, and can lead to fragmented and non-restorative sleep.

5. Shift Work Disorder: Shift work disorder occurs when an individual's work schedule requires them to work during the night or rotate shifts. This can disrupt their circadian rhythm, leading to difficulties with falling asleep and staying awake when needed.

6. Jet Lag Disorder: Jet lag occurs when individuals rapidly cross multiple time zones, leading to a misalignment between their internal circadian clock and the local time at their destination. This can result in symptoms such as daytime sleepiness, insomnia, and fatigue.

Sleep Apnea

Sleep apnea, also spelled sleep apnoea, is a sleep disorder in which pauses in breathing or periods of shallow breathing during sleep occur more often than normal. Each pause can last for a few seconds to a few minutes and they happen many times a night. In the most common form, this follows loud snoring. A choking or snorting sound may occur as breathing resumes. Because the disorder disrupts normal sleep, those affected may experience sleepiness or feel tired during the day. In children, it may cause hyperactivity or problems in school.

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Sleep apnea may be either obstructive sleep apnea (OSA), in which breathing is interrupted by a blockage of air flow, central sleep apnea (CSA), in which regular unconscious breath simply stops, or a combination of the two. OSA is the most common form.

Obstructive Sleep Apnea (OSA): OSA is the more common form of sleep apnea. It occurs when the muscles in the throat relax excessively during sleep, causing a temporary blockage of the upper airway. As a result, breathing is momentarily interrupted, leading to a decrease in oxygen levels. The brain senses this drop in oxygen and briefly awakens the individual to restore normal breathing. These awakenings are often so brief that the person may not be aware of them.

Common Signs and Symptoms of OSA:

1. Loud and chronic snoring.
2. Frequent, noticeable pauses in breathing during sleep.
3. Gasping or choking sensations during sleep.
4. Excessive daytime sleepiness.
5. Morning headaches.
6. Difficulty concentrating and memory problems.
7. Irritability and mood changes.

Central Sleep Apnea (CSA): CSA is less common and occurs when the brain fails to transmit the proper signals to the muscles responsible for controlling breathing. Unlike OSA, there is no physical obstruction in the airway. Individuals with CSA may experience pauses in breathing or periods of very shallow breathing.

Common Signs and Symptoms of CSA:

1. Frequent awakenings during the night.
2. Shortness of breath upon waking.
3. Difficulty falling asleep or staying asleep.
4. Snoring is less common in CSA.
5. Daytime fatigue and sleepiness.
6. Swelling in the legs (in some cases).

Insomnia

Insomnia, also known as sleeplessness, is a sleep disorder where people have trouble sleeping. They may have difficulty falling asleep, or staying asleep for as long as desired. Insomnia is typically followed by daytime sleepiness, low energy, irritability, and a depressed mood. Insomnia is the most common sleep disorder; almost all adults have experienced insomnia, at least for one night. This becomes a problem when sleepless nights persist and affects daytime health and functioning. Individuals with significant insomnia may experience fatigue, sleepiness, irritability, poor memory, and difficulty focusing during the waking hours.

Insomnia can be short term, lasting for days or weeks, or long term, lasting more than a month.

Insomnia can occur independently or as a result of another problem. Conditions that can result in insomnia include psychological stress, chronic pain, heart failure, hyperthyroidism, heartburn, restless leg syndrome, menopause, certain medications, and drugs such as caffeine, nicotine, and alcohol. Other risk factors include working night shifts and sleep apnea.

Types of Insomnia

- **Acute Insomnia:** This type of insomnia is short-term and often occurs in response to a specific stressor, such as a major life event, illness, or situational stress. Acute insomnia typically resolves once the triggering factor is removed or resolved.
- **Chronic Insomnia:** Chronic insomnia is characterized by persistent sleep difficulties that last for at least three nights a week and persist for at least three months. It can have various underlying causes, including medical conditions, psychiatric disorders, or lifestyle factors.

Common Causes and Risk Factors

- **Stress and Anxiety:** Emotional and psychological factors, such as stress, anxiety, and depression, are common causes of insomnia.
- **Medical Conditions:** Certain medical conditions, including chronic pain, heartburn, asthma, and neurological disorders, can disrupt sleep.

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- **Medications:** Some prescription and over-the-counter medications can interfere with sleep patterns and contribute to insomnia.
- **Lifestyle Factors:** Poor sleep habits, such as irregular sleep schedules, excessive caffeine or alcohol consumption, and a lack of physical activity, can exacerbate insomnia.
- **Shift Work:** Irregular work schedules, especially night shifts, can disrupt the body's natural sleep-wake cycle and lead to insomnia.

Symptoms and Effects

- Difficulty falling asleep (sleep onset insomnia).
- Frequent awakenings during the night (sleep maintenance insomnia).
- Early morning awakenings with an inability to return to sleep.
- Non-restorative sleep, leading to daytime fatigue and sleepiness.
- Impaired cognitive function, including difficulties with concentration and memory.
- Mood disturbances, including irritability and mood swings.
- Reduced quality of life and overall well-being.
- Increased risk of accidents, particularly in activities that require alertness (e.g., driving).

Narcolepsy

Narcolepsy is a neurological sleep disorder characterized by excessive daytime sleepiness, sudden and uncontrollable episodes of falling asleep (known as "sleep attacks"), and a range of other symptoms. It is a chronic condition that can significantly affect a person's daily life.

1. Excessive Daytime Sleepiness (EDS): Individuals with narcolepsy experience overwhelming and persistent sleepiness during the daytime, which often results in an irresistible urge to take short naps. This sleepiness can affect daily activities, including work, school, and social interactions.

2. Sleep Attacks: Narcoleptics may have sudden, brief episodes of sleep that can occur at inappropriate or unexpected times. These "sleep attacks" can be triggered by strong emotions, excitement, or monotonous activities.

3. Cataplexy: Cataplexy is a sudden loss of muscle tone triggered by strong emotions, such as laughter, anger, or surprise. It can manifest as muscle weakness, slurred speech, and even partial or complete collapse. Cataplexy is a distinctive symptom of narcolepsy.

4. Sleep Paralysis: Narcolepsy can lead to temporary episodes of muscle weakness during the transition into or out of sleep. This can result in a feeling of being unable to move, often accompanied by vivid hallucinations.

5. Hypnagogic and Hypnopompic Hallucinations: Individuals with narcolepsy may experience hallucinations when falling asleep (hypnagogic) or waking up (hypnopompic). These hallucinations can be vivid and often frightening.

6. Fragmented Nighttime Sleep: People with narcolepsy may have disrupted nighttime sleep patterns, frequently waking up during the night. This can lead to increased sleepiness during the day.

7. Disturbed Rapid Eye Movement (REM) Sleep: Unlike typical sleep patterns where REM sleep occurs after several hours of non-REM sleep, individuals with narcolepsy can enter REM sleep within minutes of falling asleep. This rapid onset of REM sleep can lead to vivid dreams and REM-related symptoms during the day.

8. Cause: The exact cause of narcolepsy is not fully understood, but it is thought to involve a deficiency of a neurotransmitter called hypocretin (also known as orexin). This deficiency may be the result of an autoimmune response in some cases.

Restless Leg Syndrome

Restless legs syndrome (RLS), also known as WillisEkbom disease (WED), is generally a long-term disorder that causes a strong urge to move one's legs. There is often an unpleasant feeling in the legs that improves somewhat by moving them. This is often described as aching, tingling, or crawling in nature. Occasionally, arms may also

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be affected. The feelings generally happen when at rest and therefore can make it hard to sleep. Due to the disturbance in sleep, people with RLS may have daytime sleepiness, low energy, irritability and a depressed mood. Additionally, many have limb twitching during sleep, a condition known as periodic limb movement disorder. RLS is not the same as habitual foot-tapping or leg-rocking. Risk factors for RLS include low iron levels, kidney failure, Parkinson's disease, diabetes mellitus, rheumatoid arthritis, pregnancy and celiac disease.

There are two main types. One is early-onset RLS which starts before age 45, runs in families and worsens over time. The other is late-onset RLS, which begins after age 45, starts suddenly, and does not worsen. Diagnosis is generally based on a person's symptoms after ruling out other potential causes.

RLS sensations range from pain or an aching in the muscles, to "an itch you can't scratch", a "buzzing sensation", an unpleasant "tickle that won't stop", a "crawling" feeling, or limbs jerking while awake. The sensations typically begin or intensify during quiet wakefulness, such as when relaxing, reading, studying, or trying to sleep.

RLS is categorized as either primary or secondary.

1. Primary RLS is considered idiopathic or with no known cause. Primary RLS usually begins slowly, before approximately 4045 years of age and may disappear for months or even years. It is often progressive and gets worse with age. RLS in children is often misdiagnosed as growing pains.
2. Secondary RLS often has a sudden onset after age 40, and may be daily from the beginning. It is most associated with specific medical conditions or the use of certain drugs

Cause- While the cause is generally unknown, it is believed to be caused by changes in the neurotransmitter dopamine resulting in an abnormal use of iron by the brain. RLS is often due to iron deficiency (low total body iron status). Other associated conditions may include end-stage kidney disease and haemodialysis, folate deficiency, magnesium deficiency, sleep apnea, diabetes, peripheral neuropathy, Parkinson's disease, and certain autoimmune diseases, such as multiple sclerosis. RLS can worsen in pregnancy, possibly due to elevated oestrogen levels. Use of alcohol, nicotine products, and caffeine may be associated with RLS.

Solutions to Asatmya Jagarana (Sleep Disorders)

Procedures/treatment to avoid Nidranasha

निद्रानाशेऽभ्यङ्गयोगो मूर्ध्नि तैलनिषेवणम्।
गात्रस्योद्वर्तनं चैव हितं संवाहनानि च॥
शालिगोधूमपिष्टान्नमक्षुक्षवसंस्कृतैः।
भोजनं मधुरं स्निग्धं क्षीरमांसरसादिभिः॥
रसैर्विलेशयानां च विष्किराणां तथैव च॥
द्राक्षासिते क्षुद्रव्याणामुपयोगो भवेन्निशि॥
शयनासनयानानि मनोज्ञानि मृदूनि च।
निद्रानाशे तु कुर्वीत तथाऽन्यान्यपि बुद्धिमान्॥

(सु.चि. 4/42-46)

In loss of sleep, massage, head-oil, anointing and mildly pressing the body are wholesome. In diet, the patient should take sweet and unctuous food consisting of edibles made of Shali rice, wheat and rice flour processed with products of sugarcane along with milk, meal-soup etc. particularly with meat-soups of hole dwellers and scatterers. In night, he should take Draksha, sugar and sugarcane products. He should also use bed, seat and carriage and other things agreeable and soft.

Syllabus- Importance of observing brahmacharya and abrahmacharya in ratricharya in relation to health. Brahmacharya with special reference to lifestyle guidelines. Reproductive and sexual health according Ayurveda.

Learning objectives-

1. Explain the importance of observing brahmacharya and abrahmacharya in relation to health
2. Describe Brahmacharya with special reference to lifestyle guidelines
3. Describe reproductive and sexual health according to Ayurveda

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Importance of Observing Brahmacharya and Abrahmacharya in Ratricharya in Relation to Health

Brahmacharya is a word that has two main meanings; in Sanskrit it means to move in a higher awareness. But throughout the world, the religious sects explain Brahmacharya as having control over sexual interactions. Brahmacharya can be understood in two ways; to be immersed in higher awareness while abstaining from all forms of sexual interactions.

Bramhacharya (abstinence) refers to the state of life when any living being refrains from excessive sensuality. This state does not mean a complete sexual abstinence but to indulge in sex such a way not to have any adverse effect on health. It is one of the prominent, most important and absolutely essential aspects of human life.

Bramhacharya - Brahma+ Charya

Brahma- ultimate knowledge

Charya-life style

Life which required for attaining ultimate knowledge, called Brahmacharya.

ब्रह्मचर्यशब्देनइन्द्रियसंयमसौमनस्यप्रभृतयोब्रम्हज्ञानानुगुणा गृह्यन्ते । (चक्रपाणिटिका च.सू. 11/35)

Bramhacharya is a process in which one has control over the sense which lead to pleasant mind and helpful to attain knowledge about Bramha i.e. supreme God.

कर्मणामनसावाचासर्वावस्थासुसर्वदा ।
सर्वत्रमैथुनमत्यागम्ब्रह्मचर्यप्रचक्षते ॥
(गरुडपुराण)

Avoidance of sexual act physically, mentally and verbally always under any circumstances is known as Bramhacharya.

According to Veda - ब्राह्मणमोक्षायचर्येब्रह्मचर्यं ।

Any type of activity, which is favourable for attaining Brahma (salvation).

As per some renounced person definition about Bramhacharya-

Brahmacharya is abstaining from all kinds of Maithuna or sexual enjoyment forever, inall places and in all conditions, physically, mentally and verbally. - **Yajnavalkya**

Know that in this world there is nothing that cannot be attained by one who remains from birth to death a perfect celibate In one person, knowledge of the four Vedas, and in another, perfect celibacy of these, the latter is superior to the former who is wanting in celibacy.- **Mahabharata**

A wise man should avoid married life as if it were a burning pit of live coals. From the contact comes sensation, from sensation thirst, from thirst clinging; by ceasing from that, the soul is delivered from all sinful existence. -**Lord Buddha**

Death is hastened by letting out semen from the body; life is saved and prolonged by preserving it. There is no doubt that people die prematurely by letting the semen out of the body; knowing this, the Yogi should always preserve semen and lead a life of strict celibacy.-**Shiva Samhita**

Sensuality destroys life, luster, strength, vitality, memory, wealth, great fame, holiness and devotion to the Supreme. - **Lord Krishna**

In Vagbhata Samhita Abrahmacharya is mentioned, to give more importance to Grihastha Ashram (having progeny), for this Abrahmacharya is required, which is also warned to have in controlled way or under limitation/ rule of sex.

कायवाङ्मनोभिमैथुनवर्ज्जनसामान्यदेकमेवगव्यते ।
(गगाधरटिकाच.सू. 11/35)

स्मरणंकिर्तनम्केलीप्रेक्षणं गुह्यभाषणं ।
संकल्पध्यवसायश्चक्रियानिर्वृत्तिरेवच ॥
एतन्मैथुनमष्टागंम प्रवक्ष्यन्तिमनीषिणः ।
विपरितंब्रह्मचर्य मेतदेवाष्ट लक्षणम ।
(योगवल्कस्मृति)

Avoid the eight kinds of enjoyment, namely, Darshana (looking at women with passionate resolve), Sparshana (touching them), Keli (play), Kirtana (praising the qualities of the other sex), Guhya-Bhashan (talking in private), Sankalpa (determination), Adhyavasaya (hearing the other sex with the desire for gratification) and

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Kriyanivritti(the actual sexual act). But it is difficult to fallow strict abstinence for everyone, so Vagbhata indicates Abramhacharya.

Importance and uses of Bramhacharya

आयुस्तेजोबलंवीर्यप्रज्ञाधीश्चमहायशः ।
पुण्यंचमनत्र्यत्वंचप्राप्यतेब्रह्मचर्यया ॥
(वृद्धगौतमस्मृति)

Celibacy is one among best enhancer of longevity.

ब्रह्मचर्यवीर्यलाभ । (योगसूत्र)

On performing celibacy one conserve Virya (energy).

त्रयउपस्तम्भाइति-आहार, स्वप्नोब्रह्मचर्यामिति, एभिस्त्रिभिर्युक्तियुक्तै रुपस्तब्धमुपस्तम्भैः संस्कारमहितमनुअपसेवमानस्य । (चरक)

Life endowed with strength, complexion and growth and continues until full span of life, provided person does not indulge in wrong activity.

ब्रह्मचर्यमायुष्याम । (च.सू. 25/40)
वीर्यबलवर्धनानाम् । (च.सू. 30/15)

Celibacy is one of the best ways to attaining goal. Adopted Celibacy will promotes longevity, strength, nourishment, delightfulness and happiness.

धर्म्ययशस्यमायुष्यंलोकद्वयरसायनम ।
अनुमोदामहेब्रह्मचर्यमेकान्तनिर्मले ॥
(अ.सं.सू. 7)

Celibacy gives success, longevity of the life, rejuvenate both the worlds, it provides peace and purity.

मरणंबिन्दुपातेनजीवनम्बिन्दुधारणत ।
यावतबिन्दुस्थितोदेहेतावतकालमर्यकुत ॥
(ह.यो.प्र.)

Excessive loss of Sukra will lead to death and preservation of Shukra lead to longevity of life. Sukra is preserved in the body the body power of body is enhanced.

आहारस्यपरंधामंशुक्रतदरक्ष्यमात्मनः ।
क्षयोह्यस्य बहूनरोगानमरणंवानियच्छति ॥
(च.नि. 6/8)

Food is untimely transformed into Sukra, so one should prevent the loss of Sukra because loss of Sukra leads to emaciation many diseases and even death.

Brahmacharya with Special Reference to Lifestyle Guidelines

Vyavaya Sambandhi Niyama (rules regarding sexual intercourse)

1. Avoid sex with a wife who is unhappy, sick, or pregnant, observing certain religious rites, menstruating, or not willing to have sex.
2. Males below 25 years should abstain (Vagbhata says before 20 years of age).
3. Females below 16 should abstain as they are not physically grown.
4. Avoid sex with a woman who thinks of another man.
5. Avoid sex with animals.
6. Avoid unnatural sex, i.e. anal or unnatural position
7. Avoid sex at a crossroad in the countryside, at a crematory or graveyard or where
8. Must not have sex without Vajikarana medicine (Aphrodisiac).
9. Avoid sex when you haven't decided.
10. Avoid sex when you are not aroused.
11. Avoid sex if you haven't had food.
12. Avoid sex if you over eat.
13. Avoid sex if body is in an irregular position.
14. Avoid sex if bed is in an irregular position.
15. Avoid sex if you are having a natural urge (having gas, need to urinate or defecate and other)
16. Avoid sex if you are tired.
17. Avoid sex when fasting.
18. Avoid sex when you are not in isolation.
19. Avoid sex while menstruating as having sex during these days you will not conceive or if you do conceive it will result in miscarriage of abnormality of child.

Effect of sex those not follow the rules of Vyayaya

1. If you have sex with menstruating women (it

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is Adharma - without morals) you lose eyesight, energy and longevity reduces.

2. If you have sex with your Guru's wife or an old woman or at sunset, you lose life energy.
3. If you have sex with a pregnant woman you willcause damage to the unborn baby.
4. If you have sex with a sick woman, it reduces her strength.
5. If you have sex with a woman who hates you, who is unclean or have sex in an unclean place, it reduces your sperm and adversely affects your own mind.
6. If you have sex when you are hungry or your mind is disturbed, when you are weak or thirsty, you lose sperm as well and Vata is provoked.

Then there are different set of rules regarding sexual union if a couple are trying to have a child (progeny)

1. This would take Panchakarma treatments of Shodhana to purify the sperm, and ovum first.
2. After the Shodhana, the couple is rejuvenated with the specific proper foods for nourishment to rebuild the system for the conception of the child.
3. Three days from menstruation: there is celibacy maintained, sleeping on the ground, eating from clean vessels, the body is kept unbathed and unkept. On the fourth day, the couple uses unction, takes a head bath, wears white apparel and garlands, having happiness and attraction to each other enter into Mithuna (sexual intercourse)
4. The sex of the child can be chosen as per the day of conception.

Rules regarding food

During this conception the woman lays only on her back as any other position aggravates the Doshas. Prone-Vata aggravation, left side-Pitta aggravation, right side - Kapha blocks the uterus. Intake of food in excess, fasting, thirst, fear, dejection, grief, anger, desire for another man, excessive desire for intercourse, with a woman too young, too old, or diseased. All prevents conception or produces abnormalities in the child.

The food that is eaten beforehand should be all wholesome and beneficial as per Ayurveda's understanding of what that is, and it should not be taken in excess but in moderation. The bed should be in an acceptable arrangement and should have pleasantries such as scent, nice bedding, and it should be comfortable. The man climbs into bed with his right leg first and the woman her left first.

Reproductive and Sexual Health According Ayurveda

Effects of Ativyavaya

अतिव्यवायाज्जयन्तेरोगश्चाऽऽक्षेपकाद्यः ।
शूलकासज्वरश्वासकार्श्यपाण्डवामयाक्षयाः ॥
(यो.र. रात्रिचर्या 47)

Over indulgence in sexual intercourse causes Akshepaka, Sula, Kasa, Jwara, Shwasa, Karshyata and Panduroga etc.

Methods of Virya Raksha

स्नानानुलेपनहिमानिलखण्डखाद्यशीताम्बुदुग्धरसयूषसुराप्रसनाः ।
सेवेतचानुशयनंविरतौरतस्यतस्याऐवमाशुवयुषः पुनरेतिधाम ॥
(यो.र. रात्रिचर्या 45)

After completion of sexual inter course, one should have bath, application of sandal wood paste etc. He should expose to cool air, consume sweets, cold drinks, mutton soup and Sura and should be happy. All these measures prevent loss of strength.

स्नानंसशर्करं क्षीरं भक्ष्यमेक्षवसंस्कृतम ।
ततोमांसरसः स्वप्नोव्यवायान्तेहिताअमी ॥
(यो.र. रात्रिचर्या 46)

After sexual intercourse, one should take refreshing bath, sugar added milk, sweets, mutton soup. Then one should go for sleep.

शुक्रलैर्गविनीयैश्चबृंहणैर्बलवर्धनैः ।
क्षीरसंजननैश्चैवपयः सिद्धंपृथ्क ॥
युक्तंगोधूमचूर्णेनसघृतक्षौद्रशर्कराम ।
पर्यायेणप्रयोक्तव्यमिच्छताशुक्रमक्षयम ॥
(च.चि. 2/3/6-7)

Milk boiled with Drugs belonging to Shukrala,

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Jivaniya, Bruhana, Bala Vardhana, and Ksheerasamjanana groups can be administrated separately. Before administration, wheat flour, ghee, honey and sugar should be added. These five recipes should be administrated separately to a person who is desirous of inexhaustible semen.

Factor which enhance strength

सद्योमांसं नवान्नं घबालास्त्री क्षीरभोजनम ।
घृतमुष्णोदकस्नानंसद्यः प्राणकराणिषट ।
(यो.र. रात्रिचर्या 23)

Fresh meat, new rice, Bala Stree, milky food, ghee and warm water or hot water bath these six factors increases the strength.

Follow the rules and regulation about Maithuna

त्र्यहाद्वसन्तशरदोः पक्षाद्वर्षानिदाघयोः शीतेरात्रौग्रीष्मेवसन्ते-तुदिवानिशि ॥ (यो.र. रात्रिचर्या 18)

- Timing in accordance with seasons,
- Sheetakala (winter) - Night Time
- Grishma (summer) - Day Time
- Vasanta (spring) - Day or Night Time
- Varsha (rainy season)-Megha Garjana (thunder)
- Sarad (autum) - one feels the sexual desire, one should indulge in sexual activity.

Time for sexual intercourse

वर्षापुथारिदध्वानेशरत्सुसरसः स्मरः ।
त्रिभिस्त्रिभिरहोभिर्हिसमेयात्प्रमदांनरः ॥
(यो.र. रात्रिचर्या 19)

According to some other opinion; a wise man should have sexual encounter once in the three days, except in Grishma (summer), where in one can indulge in fifteen days.

सर्वेष्वृतुपुधर्मेपुपक्षात्पक्षादव्रजेदबुधः ।
आयुःक्षयभयाद्विद्वान्नाह्नि सेवेतकामिनीम ॥
(यो.र. रात्रिचर्या 20)

अवशोयदिसेवेततदाग्रीष्मवसन्तयोः । (यो.र. रात्रिचर्या 21)

Restriction on sex during day time, a wise man should not indulge in sexual intercourse during day time as it may cause Ayukshaya i.e reduction in life span. If one is not self-controlled person, such person should have sex in day time, only in Grishma and Vasanta Rutu only.

Benefits of sexual intercourse

आयुष्मन्तोमन्दुजरायपुर्वर्णबलान्विताः ।
सिग्धोपचितमांसाश्चयवन्तिस्त्रीपुसंयताः ॥
(यो.र. रात्रिचर्या 16)

If person follow the rules and methods with respect in his routine sexual activities. His life span increases, aging process also become normal in accordance with age, colour, complexion and strength of the body is maintained and his body physique etc. is also maintained well.

पूतिमांसंस्त्रियोवृद्धाबालार्कस्तरुणंदधि ।
प्रभातेमैथुनंनिद्रासद्यः प्राणहरणि ॥
(यो.र. रात्रिचर्या 14)

Fermented food, aged woman, half formed curds, sex in early hours of the day and sleeping in early hours of a day decreases the strength of an individual.

दौर्बल्यंमुखशोषश्चापाण्डुत्वंसदनं श्रम ।
क्लैब्यंशुक्राविसर्गश्च क्षीणशुक्रस्यलक्षणम् ।
(च.सू. 17/69)

शुक्रक्षयेमेढ्रवृषणवेदनाऽशक्तिमैथुनेचिरादवाप्रसेकः प्रसेके-चाल्परक्तशुक्रदर्शनम ॥ (सु.सू. 15)

शुक्रेचिरातप्रसिच्येतशुक्रंशोणितमेववा ।
तोदोऽत्यर्थंवृषणयोर्मेढ्रंधूमायतीवच ॥
(अ.ह.सू. 11)

Viryanasaphala-Shukrakshaya

Dourbalya (weakness), Mukhashosha (dry mouth), Pandu (anemia), Sadana (body ache), Shrama(exhaustion), klaibya (impotency), Chirata Praseta (early ejaculation), Medra Vrushana Vedana (pain in testes and penis), Dhumaayatteva (burning sensation in testes and penis).

Shukrapradoshaja Roga-diseases due to vitiated semen

From vitiation of Shukra arise Klaibya (impotency), Aharsana (lack of sexual pleasure), birth of children who are sick, impotent, short life span, distorted shape. It affects both men and women.

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MCQ on Ratrichrya

1. How many sleep cycles do most adults go through in an average night's sleep?
   a) 1 b) 2
   c) 3 d) 4
2. What is the primary brainwave associated with deep, restorative sleep?
   a) Alpha waves b) Beta waves
   c) Delta waves d) Theta waves
3. Which stage of sleep is characterized by rapid eye movement (REM) and vivid dreaming?
   a) Stage 1 b) Stage 2
   c) Stage 3 d) Stage 4
4. What is the term for the inability to fall asleep or stay asleep through the night?
   a) Insomnia b) Narcolepsy
   c) Sleep apnea d) Sleepwalking
5. Sleep apnea is a sleep disorder characterized by:
   a) Excessive daytime sleepiness
   b) Rapid eye movement during sleep
   c) Sleep terrors
   d) Sleepwalking
6. Which hormone plays a significant role in regulating the sleep-wake cycle?
   a) Insulin b) Melatonin
   c) Serotonin d) Adrenaline
7. How many stages are there in a typical sleep cycle?
   a) 2 b) 3
   c) 4 d) 5
8. The term "Circadian Rhythm" refers to:
   a) A type of sleep disorder
   b) The body's internal clock that regulates sleep-wake patterns
   c) A sleep-inducing medication
   d) A sleepwalking condition
9. What is the average recommended amount of sleep per night for most adults?
   a) 4-5 hours b) 6-7 hours
   c) 8-9 hours d) 10-11 hours
10. Which of the following factors can affect the quality of sleep?
    a) Diet b) Exercise
    c) Stress d) All of the above
11. How many stages of Nidra are typically recognized in Ayurveda?
    a) 2 b) 4
    c) 5 d) 7
12. What is the term for the inability to fall asleep or stay asleep through the night?
    a) Insomnia b) Narcolepsy
    c) Sleep apnea d) Sleepwalking
13. Sleep apnea is characterized by:
    a) Excessive daytime sleepiness
    b) Rapid eye movement during sleep
    c) Sleep terrors
    d) Sleepwalking
14. During which stage of sleep does dreaming most commonly occur?
    a) Stage 1 b) Stage 2
    c) Stage 3
    d) REM (Rapid Eye Movement) sleep
15. Which of the following is a parasomnia characterized by sudden awakening, typically with a sense of fear or dread?
    a) Insomnia b) Sleep apnea
    c) Nightmares d) Night terrors
16. Sleep apnea is a sleep disorder characterized by:
    a) Difficulty falling asleep
    b) Frequent and loud snoring
    c) Inability to recall dreams
    d) Pauses in breathing during sleep
17. Restless Leg Syndrome (RLS) is a sleep disorder that is primarily associated with:
    a) Sleepwalking
    b) An intense fear of sleeping
    c) Unpleasant sensations in the legs and a strong urge to move them
    d) Excessive daytime sleepiness

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18. Which sleep disorder is often referred to as "excessive daytime sleepiness" and is characterized by sudden and uncontrollable episodes of falling asleep during the day?
    a) Sleepwalking b) Narcolepsy
    c) Sleep apnea
    d) REM behavior disorder
19. leepwalking, or somnambulism, occurs during which stage of sleep?
    a) Stage 1 b) Stage 2
    c) Stage 3 d) REM sleep
20. What is a common symptom of sleep disorders like sleep apnea and restless leg syndrome?
    a) Increased alertness during the day
    b) Frequent sleep talking
    c) Difficulty concentrating
    d) Reduced snoring
21. Which sleep disorder involves acting out vivid and often violent dreams during REM sleep?
    a) Insomnia
    b) Nightmares
    c) Sleepwalking
    d) REM behavior disorder
22. In which age group is Sudden Infant Death Syndrome (SIDS) most commonly observed?
    a) Infants and young children
    b) Teenagers
    c) Young adults
    d) Elderly individuals
23. What does the term "Brahmacharya" primarily refer to in Hinduism?
    a) A sacred text
    b) Celibacy and self-control
    c) A form of meditation
    d) A type of yoga
24. Which of the following is one of the main purposes of practicing Brahmacharya in the spiritual context?
    a) Acquiring material wealth
    b) Enhancing physical strength
    c) Developing spiritual purity and discipline
    d) Pursuing worldly pleasures
25. What is Restless Leg Syndrome (RLS)?
    a) A psychological disorder
    b) A sleep disorder
    c) A movement disorder
    d) A respiratory condition
26. Which of the following is a common symptom of RLS?
    a) Sudden muscle weakness
    b) Uncontrollable laughter
    c) An irresistible urge to move the legs
    d) Visual hallucinations
27. RLS is often associated with which other condition?
    a) Diabetes b) Hypertension
    c) Iron deficiency anemia d) Asthma
28. What is sleep deprivation?
    a) A sleep disorder characterized by excessive sleep
    b) A state of not getting enough sleep, either due to a lack of opportunity or a medical condition
    c) A sleep disorder characterized by vivid and disturbing dreams
    d) A medical condition that requires surgical intervention
29. How many hours of sleep per night are typically recommended for adults to avoid sleep deprivation?
    a) 4-5 hours b) 6-7 hours
    c) 8-9 hours d) 10-11 hours
30. What are common consequences of sleep deprivation?
    a) Improved cognitive function
    b) Increased risk of accidents
    c) Better mood and emotional stability
    d) Enhanced physical performance
31. What is the master circadian clock in mammals called?
    a) Suprachiasmatic nucleus (SCN)
    b) Pineal gland
    c) Hypothalamus d) Thalamus

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32. Which of the following best describes the primary function of the master circadian clock?
    a) Regulating body temperature
    b) Controlling the sleep-wake cycle
    c) Managing hunger and satiety
    d) Aiding in long-term memory formation
33. Where is the suprachiasmatic nucleus (SCN) located in the human brain?
    a) Frontal lobe b) Temporal lobe
    c) Hypothalamus d) Parietal lobe
34. What is the approximate duration of a circadian rhythm cycle in humans?
    a) 12 hours b) 18 hours
    c) 24 hours d) 36 hours
35. Sleep apnea is a sleep disorder characterized by:
    a) Excessive sleep duration
    b) Frequent and brief interruptions in breathing during sleep
    c) Nightmares and night sweats
    d) Restless leg syndrome
36. What is the primary symptom of sleep apnea?
    a) Excessive daytime sleepiness
    b) Sleepwalking
    c) Sleep paralysis
    d) Sleep talking
37. Insomnia is best described as:
    a) Excessive daytime sleepiness
    b) Difficulty falling asleep, staying asleep, or getting restorative sleep
    c) Frequent episodes of sleepwalking
    d) Vivid dreams during the REM stage of sleep
38. Chronic insomnia is typically defined as having difficulty sleeping for at least how many nights per week, for at least how many months?
    a) 2 nights per week for 2 months
    b) 3 nights per week for 3 months
    c) 4 nights per week for 4 months
    d) 7 nights per week for 7 months
39. Narcolepsy is a neurological disorder primarily characterized by:
    a) Frequent sleepwalking episodes
    b) Sudden and uncontrollable episodes of falling asleep
    c) Chronic insomnia
    d) Intense nightmares
40. One of the hallmark symptoms of narcolepsy is a sudden loss of muscle tone, often triggered by strong emotions, known as:
    a) Sleep paralysis b) Cataplexy
    c) Hypnagogic hallucinations
    d) Sleep-onset insomnia
41. People with narcolepsy often experience vivid and dream-like sensations when falling asleep or waking up. What are these experiences called?
    a) Sleepwalking b) Night terrors
    c) Hypnagogic hallucinations
    d) Sleep apnea
42. The main neurotransmitter deficiency associated with narcolepsy is:
    a) Serotonin b) Dopamine
    c) Orexin (hypocretin) d) GABA

Answers of MCQ on Ratricharya

1. C	15. D	29. C
2. C	16. D	30. A
3. D	17. C	31. B
4. A	18. B	32. B
5. A	19. D	33. C
6. B	20. C	34. C
7. D	21. D	35. B
8. B	22. A	36. A
9. C	23. B	37. B
10. D	24. C	38. B
11. C	25. C	39. B
12. A	26. C	40. B
13. A	27. C	41. C
14. D	28. B	42. C

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Chapter 4

Ritucharya

Syllabus

Classification of kaala, Adana kala and visarga kala, identification of seasons based on the ritu lakshanas in different geographical areas. Sanchaya- Prakopa- Prashamana of Dosha with their Gunas in each Ritu. Relation of Agni, Bala and Ritu with its application. Ritu Shodhana for the prevention of diseases. Pathya - Apathya in regards to Ahara -Vihara in all six Ritus in present scenario. Importance of Ahara and vihara in Ritu sandhi and Yamadanshtra kala. Rituharitaki as a Rasayana with research updates. Effects of Rituviparyaya on health and its relation to Janapadaudhwamsa/Maraka Vyadhis with present day examples.

Learning objectives

1. Explain classification of Kaala, distinguish Adana kala and visarga kala, identification of seasons based on the ritu Lakshanas in different geographical areas.
2. Analyse the Sanchaya- Prakopa- Prashamana of Dosha with their Gunas in each Ritu.
3. Describe the Relation of Agni, Bala and Ritu with its application.
4. Explain Ritu Shodhana for the prevention of diseases
5. Analyse Pathya - Apathya in regards to Ahara -Vihara in all six Ritus in present scenario.
6. Explain the importance of Ahara and vihara in Ritu sandhi and Yamadanshtra Kala.
7. Describe Rituharitaki as a Rasayana with research updates.
8. Explain the effects of Rituviparyaya on health and its relation to Janapadaudhwansa /Maraka Vyadhis with present day examples.

Total - 7 hours (Lecture :05 hour, Non-lecture: 02 hours)
MCQ- Yes- SAQ (5 Marks)- Yes- LAQ (10 Marks)- Yes

Classification of Kala

इह खलु संवत्सरं षडङ्गमृतुविभागेन विद्यात । तत्रादित्यस्योदगयनमादानं च त्रीनृतूञ्छिशिरादीन ग्रीष्मान्तान व्यवस्येत, वर्षादीन पुनर्हेमन्तान्तान दक्षिणायनं विसर्ग ॥

(च.सू. 6/3)

The year is divided into six parts according to seasons. The northward movement of the sun and its act of dehydration brings about three seasons beginning from late winter to summer. The southward movement of sun and its act of hydration gives rise to the other three seasons beginning with the rainy to early winter.

मासैर्द्विसंख्यैर्माघाद्यैः क्रमात षडतवः स्मृताः ।
शिशिरोऽथ वसन्तश्च ग्रीष्मो वर्षाशरद्धिमाः ॥
शिशिराद्यास्त्रिभिस्तैस्तु विद्याद्यनमुत्तरम ।
आदानं च, तदादत्ते नृणां प्रतिदिनं बलम ॥

(अ.हृ.सू. 3/1-2)

With every two Masa (month) commencing with Magha, are the six Rutus Sisira, Vasanta, Grishma, Varsha, Sharada and Hemanta successively; the three commencing with Sisira, Vasanta and Grishma form the Uttarayana, also known as Adana Kala because the sun takes away the strength of the people daily.

तत्र माघाद्यो द्वादश मासाः, द्विमासिकमृतुं कृत्वा षडऋतवो भवन्तिः ते शिशिरवसन्तग्रीष्मवर्षाशरद्धेमन्ताः तपस्तपस्यौ शिशिरः, मधुमाधवौ वसन्तः शुचिशुक्रौ ग्रीष्मः,

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नभोनभस्यौ वर्षाः, इषोर्जौ शरत, सहःसहस्यौ हेमन्त इति ॥
(सु.सू. 6/6)

ग्रीष्मो मेशरुशौ प्रोक्तौ पावडमिथुन कर्कयो।
सिहकन्ये स्मृता वर्षास्तुलावृश्चिकयोः शरत।
धनुर्ग्रहौ च हेमन्तो वसन्तः कुम्भमीनयोः ॥
(शा.सं. 2/25-26)

गगांया दक्षिणे देशे वृष्टेर्बहुलभावतः।
उभौ मुनिभिरख्यातौ प्रावृद्ड्वर्षाभिधावृतू।
तस्या एवोत्तरे देशे हिमप्रचुरभावतः।
एतावुभौ समाख्यातौ हेमन्तशिशिरावृतू।
(भा.प्र.5 दिनचर्या अध्याय)

शिशिरः पुष्यसमयो ग्रीष्मो वर्षाशरद्भिमा।
माघादिमासयुग्म स्युऋतवः षट क्रमादमी ॥
(भा.प्र. 5 दिनचर्या अध्याय)

Ayana	Seasons	Months according to Hindu calendar	Month according to English calendar	Rasi of Sun	Predominant rasa in that Seasons
Uttarayana (northern solastice) Adana Kala (debilitating period)	Sisira Late Winter	Magha/Tapa Phalguna/Tapasya	Mid January-Mid March	Makara Kumbha	Tikta
	Vasanta Spring	Caitra/Madhu Vaishakha/Madhava	Mid March-Mid May	Mina Mesha	Kashaya
	Grishma Summer	Jyestha/Suchi Asadha/Sukra	Mid May-Mid July	Vrushabha Mithuna	Katu
Dakshinay-ana (southe-rn solastice) Visarga Kala (strength period)	Varsha Rainy	Shravana/Nabha Bhadrapada/ Nabhasya	Mid July-Mid September	Karkataka Simha	Amla
	Sharad Autumn	Asvina /Isha Kartika /Urja	Mid September Mid November	Kanya Tula	Lavana
	Hemanta Winter	Margasira/Saha Pausha/Sahasya	Mid November Mid January	Vruscika Dhanu	Madhura

Adana Kala and Visarga Kala and Identification of Seasons Based on the Ritu Lakshanas in Different Geographical Areas

Adana Kala (Uttarayana)

तस्मिन ह्यत्यर्थतीक्ष्णोष्णरुक्षा मार्गस्वभावतः।
आदित्यपवनाः सौम्यान क्षपयन्ति गुणान भुवः।
तिक्तः कषायः कटुको बलिनोऽत्र रसा क्रमात।
तस्मादादानमाग्नेयम् .....॥ (अ.ह.सू. 3/3)

आदानं पुनराग्नेयं तावेतावर्कवायू सोमश्च कालास्वभावमार्गपरिगृहीताः कालर्तुरसदोष देहबलनिर्वृत्ति-प्रत्ययभूताः समुपदिश्यन्ते ॥ (च.सू. 6/5)

Due to nature of the Marga (path), both the Aditya (sun) and Pavana (wind) become very Tikshna (strong), Ushna (hot) and Ruksha (dry) during this Ayana (Uttarayana) and take away all the Saumya Guna (cooling qualities) of the Bhu (earth). Rasa (tastes) like Tikta (bitter), Kashaya (astringent) and Katu (pungent) becomes sucessively Balina (stronger) during this Kala. Hence Adana Kala is Agneya predominantly.

Effect of Adana Kala on Body

तत्र रविर्भाभिराददानो जगतः स्नेहं वाययस्तीव्ररुक्षाश्चोपशोशयन्तः शिशिर वसन्तग्रीष्मेषु यथाक्रमं रौक्ष्यमुत्पादयन्तो रुक्षान रसांस्तिक्तकषायकटुकांश्चभिवर्धयन्तो नृणां दौर्बल्यमावहन्ति ॥ (च.सू. 6/6)

During the period of Adana Kala not only the sun with its rays, but also winds their sharp velocity and dryness, absorb the moisture from the earth. Winds progressively bring about dryness in the

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atmosphere during the three seasons of periods, viz Shishira, Vasanta and Grishma, which enhance the Tikta, Kashaya, Katu tastes respectively, all having dryness effects and as result, human being also become weak.

Visarga Kala (Dakshinayana)

.....ऋतवो दक्षिणायनम।
वर्षाद्यो विसर्गश्च यद्बलं विसृजत्ययम॥
सौम्यत्वादत्र सोमो हि बलवान हियते रविः।
मेघवृष्ट्यनिलैः शीतैः शान्ततापे महितले।
स्निग्धश्छेहाम्ललवणमधुरा बलिनो रसाः॥
(अ.ह.सू. 3/4-6)

During Dakshina Ayana, the sune releases teh Bala (strength) of the people, because the Soma (moon) is more Saumya (cooling property enhances) and Ravi (sun) loses his Bala (strength). The Shita (cooling) of Megha (clouds), Vrishti (rain) and Anila (wind) cool down the fiery Mahitala (earth). this results in development of Snighata (unctuousness) and Rasa (tastes) like Amla (sour), Lavana (salt) and Madhura (sweet) are powerful respectively during this period.

Effect of Visarga Kala on Body

वर्षाशरद्धेमन्तेशु तु दक्षिणाभिमुखेऽर्के कालमार्गमेघवात-वर्षाभिहतप्रतापे, शशिनि चाव्याहतबले, माहेन्द्रसलिल-प्रशान्तसन्तापे जगति, अरुक्षा रसाः प्रवर्धन्तेऽम्ललवणमधुरा यथाक्रमं तत्र बलमुपचीयते नृणामिति॥ (च.सू. 6/7)

During the Varsha, Sharad and Hemanta, the sun moves towards the south, and its power of heating is slackened by various factors, viz. the time, course, storm and rain but the moon is not affected. The earth is relieved of its heat by the rain causes unctuousness in the body grow during the Varsha, Sharad and Hemanta respectively. As a result of all these, human beings also progressively grow in strength during the period of Visarga Kala.

Attribution of Adana Kala and Visarga Kala

Adana Kala	Visarga Kala
Uttarayana-Agneya	Dakshinayan-Soumya
Agneya-Agni Guna	Soumya-Sheeta Guna
Pradhana	Pradhana
Vayu-Ati-ruksha	Vayu-Not so Ruksha
Moon- Less Bala	Moon- Strong Bala
Sun-Strong Bala	Sun-Less Bala
Sun dries away Things	Moon Nourishes Things
Ruksha,Tikta, Kashaya, Katu	Snigdha, Amala, Madhura, Lavan
Gruadully Bala Lessens	Gradully Bala Increases

Sanchaya- Prakopa- Prashamana of Dosha with their Gunas in each Ritu

चयप्रकोपापशंमा वायोर्ग्रीष्मदिषु त्रिषु।
वर्षाऽऽदिषु च पित्तस्य श्लेष्मणः शिशिरादिषु॥
(भा.प्र. दिनचर्या प्रकरण)

Dosha	Sanchaya (Accumulation)	Prakopa (Vitiation)	Shamana (Pacification)
Vata	Greeshma	Varsha	Sharad
Pitta	Varsha	Sharad	Hemanta
Kapha	Sisira	Vasanta	Greeshma

चीयते लघु रुक्षाभिरोषधीभिः समीरणः।
तद्विधस्तद्विधे देहे कालस्यौष्ण्यान्न कुप्यति।
(भा.प्र. दिनचर्या प्रकरण)

Vata undergoes Sanchaya in Grishma Rutu due to predominance of Laghu and Ruksha properties in foods and in the bodies of similar qualities, but does not undergo Prakopa due to the heat of the season.

अद्भिरम्लविपाकाभिरोषधीभिश्च तादृशम।
पित्तं याति चयं कोपं न तु कालस्य शैत्यतः॥
(भा.प्र. दिनचर्या प्रकरण)

Pitta undergoes mild increase in Varsha Rutu because of water and food coming sour at the end of digestion but does not undergo great increase due to cold of the season.

चीयते स्निग्धशीताभिरुदकौषधिभिः कफः।
तुल्ये च काले देहे च स्कन्नत्वाना प्रकुप्यति॥
(भा.प्र. दिनचर्या प्रकरण)

Kapha undergoes mild increase in Shishira Rutu because of Snigdha and Sheeta predominance

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in water and foods and in the bodies of men similar qualities but does not undergo great increase because of its solidification.

हिमे याति शमं पित्तं वायुः श्लेष्मा च चीयते।
स वायुः शिशिरे कोपं यात्येवोपचित्तः कफ॥
हेमन्ते सञ्चितः श्लेष्मा शिशिरे त्वतिचीयते।
शीतस्निग्धगुरुद्रव्यैः शैत्यस्कन्नो न कुप्यति॥
(भा.प्र. दिनचर्या प्रकरण)

During Hemanta Rutu Pitta becomes decreased to normal while Vata and Kapha increase slightly, that Vata increase greatly in Sisira whereas Kapha undergo mild decrease. Kapha which undergoes mild increase in Hemanta increase further in Sisira Rutu due ingestion of foods of cold, Snigdha and Guru qualities but still does not undergo Parkopa since it becomes solidified by cold. This is the nature of seasons and relation of Doshas.

इति कालस्वभावोऽयमाहारादिवशात्पुन।
चयादीन यान्ति सद्योऽपि दोषाःकाले विशेषतः॥
(भा.प्र. दिनचर्या प्रकरण)

Doshas undergo Chaya, Prakopa and Shamana immediately also, by the effect of food and especially so in the seasons.

Rutu Guna

हेमन्तः शीतलः स्निग्धः स्वादुर्जङ्गरवन्हिकृत।
शिशिरः शितलोअतीव रुक्षो वाताग्निवर्धनः॥
(भा.प्र. दिनचर्य अध्याय 5)

Hemanta is cold, unctuous, sweet and enhances digestive fire. Shishira is very cold, dry increase Vata and Agni.

चीयते लघुरूक्षाभिरोषधीभिः समीरणः॥
तद्विधस्तद्विधे देहे कालस्यौष्ण्यान्न कुप्यति।
अद्भिरम्लविपाकाभिरोषधीभिश्च तादृशम्॥
पित्तं याति चयं कोपं न तु कालस्य शैत्यतः।
चीयते स्निग्धशीताभिरुदकौषधिभि कफः॥
तुल्येऽपि काले देहे च स्वल्पत्वान्न प्रकुप्यति।
(अ.ह.सू. 12/25-27)

- Samirana (Vata) undergoes Chaya (mild increase) in Grishma (summer), by the use of plant possessing qualities such as Laghu, Ruksha etc. in the body of person possessing such qualities, but Vata does not undergo Prakopa (increase) because of heat of season.
- Pitta undergoes Chaya (mild increase) in Varsha (rainy), because of food substance that used possess Amla Vipaka, but not Prakopa because of Shita (coldness) of the season.
- Kapha undergoes Chaya (mild increase) by the use of food and water which possess qualities such as Snigdha (oily) and Shita in the season Shishira (winter) and body of person of similar nature but does not undergo Prakopa because of Kapha becomes solidified.

Relation of Agni, Bala and Ritu with its Application.

According to Ayurveda, at the beginning and end of Visarga and Adana periods respectively, the Agni of the individual will be weak. During middle of Adana Kala and middle of Visarga Kala Agni will be moderate/medium. During the end and beginning respectively the Agni of individual will be best.

Ayana	Rutu	Month	Hindi Month	Agni
Uttarayana/ Adana kala	Shishira	Jan-Feb	Magha-Falguna	Teekshnagni
	Vasanta	Mar-April	Chaitra-Vaishakh	Madhyamagni
	Grishma	May-June	Jyeshtha-Ashadha	Mandagni
Dakshinayana/ Visharga Kala	Varsha	July-Aug	Sravan-Bhadrapada	Mandagni
	Sharada	Sep-Oct	Ashwina-Kartika	Madhyamagni
	Hemanta	Nov-Dec	Margashisha-Pausha	Teekshnagni

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Strength of the body in Six Rutus

शीतेऽग्र्यं वृष्टिघर्मेऽल्पं बलं मध्यं तु शेषयोः ।
(अ.हृ.सू. 3/7)

आदावन्ते च दौर्बल्यं विसर्गादानयोर्नृणाम ।
मध्ये मध्यबलं, त्वन्ते श्रेष्ठमग्रे च निर्दिशेत ॥
(च.सू. 6/8)

In Sitakala (Hemanta and Sisira) the strength of the people will be maximum, during Varsha and Grishma Rutu it will be poor and remaining Vasanta and Sharad Rutu, and it will be medium.

Status of Bala during Year

Uttarayana			Dakshinayana		
Sisira	Vasanta	Grishma	Varsha	Sharad	Hemanta
Aadi Uttam	Madhya Madhyam	Anta Avara	Aadi Avara	Madhya Madh-yam	Anta Uttam

Ritu Shodhana for the Prevention of Diseases

Dosha Shodhana in Rutu Charya (Ref-Su.Su.6/38, Cha. Su. 7/46-50, A. Hr. Su. 4/35, Su.Su.6/12, Bha . Pra. Pu. Kha Dinacharya Adhyaya)

तत्र वर्षाहेमन्तग्रीष्मेषु सञ्चितानां दोषाणां ।
शरद्वसन्तप्रावृट्सु च प्रकुपितानां निर्हरणं कर्तव्यम् ॥
(सु. सू. 6/12)

हरेव्दसन्ते श्लेष्माणं पित्तं शरदि निर्हरेत ।
वर्षासु शमयेद्वायं प्राग्विकारसमुच्छयात ।
(सु.सू. 6/38)

One should eliminate Kapha in Vasanta Rutu, Pitta in Sharad Rutu, and Vayu in Varsha Rutu, prior to the emergence of disorders.

माधवप्रथमे मासि नभस्यप्रथमे पुनः ।
सहस्यप्रथमे चैव हारयेद्दोषसंचयम् ॥
स्निग्धस्विन्नशरीराणामूर्ध्वं चाधश्च नित्यशः ।
वस्तिकर्म ततः कुर्यान्नस्यकर्म च बुद्धिमान् ॥
यथाक्रमं यथायोग्यमत ऊर्ध्वं प्रयोजयेत् ।
रसायनानि सिद्धानि वृष्ययोगांश्च कालवित् ॥
रोगास्तथा न जायन्ते प्रकृतिस्थेषु धातुषु ।
धातवश्चाभिवर्धन्ते जरा मान्द्यमुपैति च ॥
विधिरेष विकाराणामनुत्पत्तौ निदर्शितः ।
निजानामितरेषां तु पृथगेवोपदेक्ष्यते ॥
(च. सू. 7/46-50)

To maintain the healthy condition of individual should undergo with Rasayana and Vajikarana Dravya. Before adopting Rasayana and Vajikarana Shodhanadi procedure need to be followed along with Snehana and Swedana as Purvakarma. Yathayogyata (by considering Yogya and Ayogya – indication and contrain-dication), Yatha Karma (in sequence of Panchakarma followed with Snehana and Swedana).

शीतोद्भवं दोषचयं वसन्ते विशोधनं ग्रीष्मजमभ्रकाल ।
घनात्यये वार्षिकमाशु सम्यक् प्राप्नोति रोगानृतुजान्न जातु ॥
(अ.हृ.सू. 4/35)

The accumulated Dosha of cold seasons (Hemanta and Shishira) should be purified in Vasanta Rutu. Similarly those accumulated in Grishma Rutu should be eliminated during Varsha Rutuand the Dosha accumulated in Varsha Rutu also should be expelled from the body during Sharada Rutu. By this one can avoid seasonal diseases.

Pathya - Apathya in Regards to Ahara - Vihara in all Six Ritus in Present Scenario Hemanta Rutu (Winter Season)

(Ref. Cha.Su. 6/9-18, Bha.Pra. Pu. Kha 5, Su.Su. 6/22-23, Yo. Ra. Rutucharya Adhyaya)

बलिनः शीतसंरोधाद्धेमन्ते प्रबलोऽनलः ।
भवत्यल्पेन्धनो भातुन स पचेद्वायुनेरितः ॥
अतो हिमेऽस्मिन्सेवेत स्वाद्वम्ललवणान्रसान ।
(अ.हृ.सू. 3/7-8)

In Hemanta Rutu, the people are Balina (strong); the Anala (digestive activity) becomes powerful because it gets obstructed by the Shita (cold atmosphere). It begins to digest the tissues supported by Vayu (Vata); so in this Hemanta Rutu, use of Madhura (sweet), Amla (sour), Lavan (salt) Rasa Ahara should be made for eat.

दैर्घ्यान्निशानामेतर्हि प्रातरेव बुभुक्षितः ।
अवश्यकार्यं सम्भाव्य यथोक्तं शीलयेदनु ॥
वातन्घतैलैरभ्यङ्गं मूर्ध्नि तैलं विमर्दनम ।
नियुद्धं कुशलैः सार्धं पादाघातं च युक्तितः ॥
(अ.हृ.सू. 3/9-10)

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As the night are longer, persons feel hungry in the early morning itself, so after cleansing of the body, they should resort to the regimen as enumerated in Abhyanga procedure with medicated oil with Vata alleviating property, Murdhi Taila bathing the head with more of oil, Vimardana (mild massaging of the body), Niyuddha (wrestling) with the Kushala (skilled) to half of his strength and Padaghata (judicious trampling of body).

कषायापहृतस्नेहस्ततः स्नातो यथाविधि।
कुङ्कुमेन सदर्पेण प्रदिग्धोऽगुरुधूपितः।
रसान स्निग्धान पलं पुष्टं गौडमच्छसुरां सुराम।
गोधुमपिष्टमाषेक्षुक्षीरोत्थविकृतीः शुभाः।
नवमन्नं वसां तैलं, शौचकार्ये सुखोदकम।
प्रावाराजिनकौशेयप्रवेणीकौचवास्तृतम ॥
उष्णस्वभावैर्लघुभिः प्रावृतः शयनं भजेत।
युक्त्याऽर्ककिरणान स्वेदं पादत्राणं च सर्वदा ॥

(अ.ह.सू. 3/11-14)

After the Abhyanga should be removed by washing with Kashaya decoctions, powder etc. and Snana (bathing); then fine paste or powder of Kumkuma and Darpa should be applied, the body exposed to the Dhupana (fumes) of Aguru; Rasa (meat soup) mixed with fats, meat of fattened animals, wine prepared with jiggery supernatant portion of Suras and Sura as such should be made use of food prepared from the flour of Godhuma (wheat), Masha (black gram), Ikshu (products of sugarcane) and Kshira (milk), food prepared from Navanna (freshly harvested corn), Vasa (muscles, fat) and Taila (edible oils) should be partaken as food; Sukhoshna (warm water) should be used for cleaning , Ushna (warm) and Laghu (light) clothing made of Pravara (cotton), Ajina (leather), Kausheya (silk), Praveni (wool) and Kuchava (kashmiri wool) used during Shayana (sleeping); Arka Kirana (exposure to sunlight) and Sweda (fire) should be resorted to judiciously; Padatrana (foot wear) should be worn always.

पीवरोरुस्तनश्रोण्यः समदः प्रमदाः प्रियाः।
हरन्ति शीतमुष्णाङ्गो धूपकुङ्कुममद्यौवनैः ॥

(अ.ह.सू. 3/15)

Pramada (women) who have well Pivara Uru (developed thighs), Stana (breasts) and Shron (buttocks), who are Samada (enchanting) and Priya (exhilarated) by the use of Dhupana (fragrant fumes), scents and youthfulness and thus made warm in their body, and who liked, drive away the cold by their embrace etc.

अङ्गारतापसन्तप्तगर्भभूवेश्मचारिणः ।
शीतपारुश्यजनितो न दिषो जातु जायते ॥

(अ.ह.सू. 3/16)

Persons who spend their time residing in houses kept warm by fire, in inner most apartment encircled with others or in underground chambers, will not be affected by the disorders due to cold and dryness.

Hemanta Rutu (Winter season)

(Ref. Cha.Su. 6/9-18)

शीते शीतानिलस्पर्शसंरुद्धो बलिनां बली।
पक्ता भवति हेमन्ते मात्राद्रव्यगुरुक्षमः ॥
स यदा नेन्धनं युक्तं लभते देहजं तदा।
रसं हिनस्त्यतो वायुः शीतः शीते प्रकुप्यति ॥
तस्मात्तुपारसमये स्निग्धाम्ललवणान् रसान्।
औदकानूपमांसानां मेद्यानामुपयोजयेत् ॥
बिलेशयानां मांसानि प्रसहानां भृतानि च।
भक्षयेन्मदिरां शीधुं मधु चानुपिबेन्नरः ॥
गोरसानिक्षुविकृतीर्वसां तैलं नवौदनम्।
हेमन्तेऽभ्यस्यतस्तोयमुष्णं चायुर्न हीयते ॥
अभ्यङ्गोत्सादनं मूर्ध्नि तैलं जेन्ताकमातपम्।
भजेद्धूमिगृहं चोष्णमुष्णं गर्भगृहं तथा ॥
शीतेषु संवृतं सेव्यं यानं शयनमासनम्।
प्रावाराजिनकौषेयप्रवेणीकुथकास्तृतम् ॥
गुरूष्णावासा दिग्धाङ्गो गुरुणाऽगुरुणा सदा।
शयने प्रमदां पीनां विशालोपचितस्तनीम् ॥
आलिङ्ग्यागुरुदिग्धाङ्गीं सुप्यात् समदमन्मथः।
प्रकामं च निषेवेत मैथुनं शिशिरागमे ॥
वर्जयेदन्नपानानि वातलानि लघूनि च।
प्रवातं प्रमिताहारमुदमन्थं हिमागमे ॥

(च.सू. 6/9-18)

In Hemanta Rutu, in person endowed with strength due to the contact of Shitanila (air cooled by effect of season), the Sarirosma (body heat) is prevented from being lost. This increases the Vahni (digestive fire) in person already having good

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appetite and hence is able to digest stuffs which are otherwise heavy for digestion and in excess. When sufficient food is not provided for digestion, the Dehaja Agni starts digesting or decreasing the Rasa Dhatu resulting in aggravation of Vata. So, the following foods are recommended to consume during Tusara Samaya (Hemanta Rutu) the time of dew.

Pathya Ahara (wholesome food)- Therefore, during the winter one should take foods having qualities of Snigdha (oily), Amla (sour) and Lavana (salt). Audaka mamsa (meat of the aquatic animals), Anupa Mamsa (meat of animals from marshy place), Medya (meat with fat), Bileshaya Mamsa (meat of burrow- dwelling animals) and Prasaha (animals which catch food by teeth, tear and eat), Madira (wine), Seedhu (fermented liquid prepared with ripened fruit should be consumed with honey). Gorasa Vikruti (cow milk and its products), Ikshu Vikruti (sugarcane and its juice products like sugar), Vasa (fat of animals) Taila (sesame oil, Nava Odana (fresh rice and grains), Ushna Toya (hot water).

Pathya Vihara- Abhyanga (oil massage), Utsadana (palm massage), Murdhni taila (oil application to head), Jentaka Sweda (a type of sweating therapy), Ushnabhumigruha (where one resides in an underground home), Atapa (exposure to sunlight). Ushnagarbhagruha (residing room which is carefully heated), Siteshu samvruta (One should ensure that conveyance, bedding and seats are well covered with heavy wrappers), use Pravara (thick blankets), Ajina (animals hides), Kauseya (silk cloth), Praveni (woollen cloth), Kuthaka (thick cotton blankets), Maithuna (sexual intercourse) with female should smear his body with Agaru. Digdhanga (One should embrace a healthy woman with big breasts, who has anointed with Agaru etc. substances.

Shishira Rutu (Late Winter)

(References - Cha.Su.6/19-21, Bha. Pra. 5/330, Su.Su. 6/24, Yo. Ra. Rutucharya Adhyaya)

अयमेव विधिः कर्य्यः शिशिरेऽपि विशेषतः।
तदा हि शीतमधिकं रौक्ष्यं चादानकालजम॥
(अ.ह.सू. 3/17)

Even in Shishira Rutu the same regimen should be adopted more intensely for during this period cold is severe and dryness more, being the effects of Adana Kala.

हेमन्तशिशिरौ तुल्यौ शिशिरेऽल्पं विशेषणम्।
रौक्ष्यमादानजं शीतं मेघमारुतवर्षजम्॥
तस्माद्धैमन्तिकः सर्वः शिशिरे विधिरिष्यते।
निवातमुष्णं त्वधिकं शिशिरे गृहमाश्रयेत्॥
कटुतिक्तकषायाणि वातलानि लघूनि च।
वर्जयेदन्नपानानि शिशिरे शीतलानि च॥
(च.सू. 6/19-21)

The Hemanta (winter) and Sisira (late winter) seasons are similar. But the dryness of Adana Kala (Sisira falls in Adana Kala) and Sita (cold) caused by Megha (cloud), Maruta (wind) and Varsha (rain) intensifies. So the entire prescription for Hemanta (winter) is to be followed in the Sisira as well. One should stay in a Nivata (windless) and Adhika Ushna (warm) home. One should avoid taking such of the diets and drinks as are possessed of Katu (pungent), Tikta (bitter) and Kashaya (astringent) tastes which cause Vata imbalance. One should avoid foods that are light to digest, food having coolant property and cold drinks.

Vasanta Rutu (Spring Season)

(References - Cha.Su.6/22-26, Bha. Pra. 5, Su.Su. 6/25-28, Yo. Ra. Rutucharya Adhyaya)

कफश्चितो हि शिशिरे वसन्तेऽर्कांशुतापितः।
हत्वाऽग्निं कुरुते रोगानतस्तं त्वरया जयेत॥
तीक्ष्णैर्वमननस्याद्यैर्लघुरुक्षैश्च भोजनैः।
व्यायामोद्वर्तनाघातैर्जित्वा श्लेष्माणमुल्वणम॥
स्नातोऽनुलिप्तः कर्पूरचन्दनागुरुकुङ्कुमैः।
पुराणयवगोधूमक्षौद्रजाङ्गलशून्यभुक।
सहकाररसोन्मिश्रानास्वाद्य प्रिययार्पितान।
प्रियास्यसङ्गसुरभीन प्रियानेत्रोत्पलाङ्कितान॥
सौमनस्यकृतो हृद्यान्तयस्यैः सहितः पिबेत।
निर्गदानासवारिष्टसीधुमार्द्वीकमाधवान॥
शृङ्गबेराम्बु साराम्बु मध्वम्बु जलदाम्बु च।
(अ.ह.सू. 3/18-22)

Kapha which has undergone increase in Sisira

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Rutu becomes liquefied by the heat of the sun in Vasanta, diminishes the Agni, and gives rise to many diseases hence kapha should be controlled quickly, by resorting to strong Vamana, Nasya and other therapies, and also by food which are easily digestible and Ruksha Ahara, physical exercise, Udvartana, etc. Having thus mitigated the Kapha, the person should take bath, anoint the body with the paste of Karpura, Candan, Aguru and Kumkuma, make use of old Yava, Godhuma, Madhu, meat of animals of desert- like land and meat roasted in fire as food; drink the juice of mango fruit mixed with fragrant substances, in the company of friends, getting it served by the beloved women which has been made more pleasant by the sweet scent of their body and the grace of their lily- like eyes; the drink, thereby producing satisfaction to the mind and heart. He should also make use of unspoiled beverages such as Asava, Arsta, Sidhu, Mardvika, Madhava or water boiled with Srngavera or Sarambu or water mixed with honey, or water boiled with Musta.

दक्षिणानिलशीतेषु परितो जलवाहिषु ।
अदृष्टनस्तसूर्येषु मणिकु टिमकान्तिषु ।
परपुष्टविधुष्टेषु कामकमान्तभूमिषु ।
विचित्रपुष्प विधुष्टेषु कामकर्मान्तभुमिषु ॥
विचित्रपुश्पवृक्षेषु काननेषु सुगन्धिषु ।
गोष्ठीकथाभिश्चित्राभिर्मध्याह्नं गमयेत्सुखी ॥

(अ.ह.सू. 3/23-25)

The person should spend his midday happily in the company of friends engaged in pleasant games, pastimes, storytelling etc. in forests or garden which have cool breeze from south direction, with plenty of reservoirs of water all around, invisible or poor sunlight, the land covered with shining crystals, with the cuckoo everywhere making pleasant sound and engaged in lovely play, with trees of different kinds of beautiful and sweet smelling flowers.

गुरुशीतदिवास्वौनस्निग्धाम्लमधुरांस्त्यजेत ।

(अ.ह.सू. 3/26)

Foods which are hard to digest and cold, sleeping at day time, foods which are fatty, Amala and Madhura Rasa should be avoided.

Vasanta Rutu (Spring Season)

(References - Cha.Su.6/22-26)

वसन्ते निचितः श्लेष्मा दिनकृद्भाभिरीरितः ।
कायाग्निं बाधते रोगांस्ततः प्रकुरुते बहून् ॥
तस्माद्वसन्ते कर्माणि वमनादीनि कारयेत् ।
गुर्वम्लस्निग्धमधुरं दिवास्वप्नं च वर्जयेत् ॥
व्यायामोद्वर्तनं धूमं कवलग्रहमञ्जनम् ।
सुखाम्बुना शौचविधिं शीलयेत् कुसुमागमे ॥
चन्दनागुरुदिग्धाङ्गो यवगोधूमभोजनः ।
शारभं शाशमैणेयं मांसं लावकपिञ्जलम् ॥
भक्षयेन्निर्गदं सीधुं पिबेन्माध्वीकमेव वा ।
वसन्तेऽनुभवेत् स्त्रीणां काननानां च यौवनम् ॥

(च.सू. 6/22-26)

During spring, Kapha that is accumulated in winters gets liquefied by the sun heat and disturbs the digestion power. It may leads to many diseases.

Pathya Ahara (wholesome Diet)- Yava (barley), Godhuma (wheat), Meat of Sarabha (Wapiti), Shasha (Rabbit), Ena (Antelope), Lava (common quail) and Kapinjala and Mridvika (raisins), Nirgada, Sidhu types of wine.

Apathya Ahara (unwholesome diet)- One should avoid Guru (heavy to digest foods), Snigdha foods (oily), Amla (sour) and Madhura (sweet) Rasa foods.

Pathya Vihara (wholesome regimen)- One should undergo therapies like Vamana (vomiting therapy), at the advent of spring one should habitually resort to Vyayama (exercise), Udvartana (dry massage), Dhumapana (smoking), Kavalagraha (gargling) and Anjana (collyrium). Lukewarm water should be utilized for cleaning and other purposes. One should smear his boy with Chandana (Sandalwood) and Aguru (Aquilaria Agalocha). One should enjoy the Maithuna (sexual intercourse) with Yauvana Stri (young lady) in Garden.

Apathya Vihara (unwholesome regimen) - Divasvapna (one should not also sleep during day time).

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Grishma Rutucahrya (Summer Season)

(References - Cha.Su.6/27-33, Bha. Pra. 5, Su.Su. 6/29-30 Yo. Ra. Rutucharya Adhyaya)

तीक्ष्णांशुरतितीक्ष्णांशुर्ग्रीष्मे सम्क्षिपतीव यत ॥
प्रत्यहं क्षीयते श्लेष्मा तेन वायुश्च वर्धते ।
अतोऽस्मिन्पदुकटम्लव्यायामार्कक्रामस्त्यजेत ।
(अ.ह.सू. 3/26-27)

In Grishma (summer) the sun rays become powerful and appear to be destructive. Kapha decreases day by day and Vata increases consequently, hence in this season avoid use of Lavan, Katu and Amal rasa foods, heavy physical exercises and exposure to sunlight.

भजेन्मधुरमेवान्नं लघु स्निग्धं हिमं द्रवम ।
सुशीततोयसिक्तङ्गो लिह्यात्सक्तून सशर्करान ॥
(अ.ह.सू. 3/28)

Food -which are Madhura Rasa, light (easy to digest), fatty, cold and liquid should be taken, take corn flour mixed with cold water and sugar after taking bath in cold water.

Indication for limited use of wine during summer

मद्यं न पेयं, पेयं वा स्वल्पं, सुबहुवारि वा ।
अन्यथा शोषसशैथिल्यदाहमोहान करोति तत ॥
(अ.ह.सू. 3/29)

Madya (wine) should not be taken; if very necessary, taken in very little quantity or diluted with more quantity of water; if wine is taken in large doses, it will cause inflammatory conditions, it will make the body fragile and weak, increases burning sensation and causes delusion.

कुन्देन्दुधवलं शालिमश्नीयाज्जाङ्गलैः पलैः ।
पिबेद्रसं नातिघनं रसालां रागखाण्डवौ ॥
पानकं पञ्चसारं वा नवमृभ्दाजने स्थितम ।
मोचचोचदलैर्युक्तं साम्लं मृन्मयशुक्तिभिः ॥
पाटलावासितं चाम्भः सकर्पूरं सुशीतलम ॥
(अ.ह.सू. 3/30)

During summer, boiled ricewhite in color, (like full moon) should be eaten along with meat of animals of desert. Meat juice (Mamsa rasa) which is not very thick, Rasala (curds churned and mixed with pepper powder and sugar), Raga (syrup which is sweet, sour and salty)and Khandava (syrup which has all the tastes, prepared with many substances), Panaka Panchasara, (syrup prepared with Draksha, Madhuka, Karjura, Kasmarya, and Parushaka fruits all in equal quantities, cooled and added with powder of Twak, Ela and Patra etc. and kept inside a fresh mud pot, along with leaves of plantain and coconut trees, and made sour (fermented) should be drunk in mugs of mud or shell; Very cool water kept in mud pot along with flowers of Patala And Karpura (camphor) should be used for drinking.

शशाङ्ककिरणान भक्ष्यान रजन्यां भक्षयन पिबेत ।
ससितं माहिषं क्षीरं चन्द्रनक्षत्रशीतलम ॥
(अ.ह.सू. 3/31)

Food articles like Shashanka Kirana (hollow, finger-like, fried pastry made of corn flour) should be taken at night; Buffalo milk mixed with sugar and cooled by moonlight and the stars should be used for drinking.

अभ्रङ्कषमहाशालतालरुद्धोष्णरश्मिषु ॥
वनेषु माधवीश्लिष्टद्राक्षास्तवकशालिषु ।
सुगन्धि हिमपानीयसिच्यमानपटालिकै ॥
कायमाने चिते चूतप्रवालफललुम्बिभिः ।
कदलिदलकह्लारमृणालकमलोत्पलैः ।
कोमलैः कल्पिते तल्पे हसत्कुसुमपल्लवे ।
मध्यंदिनेऽर्कतापार्तः स्वप्याद्धारागृहेऽथवा ॥
पुरस्त्रीस्तनहस्तास्यप्रवृत्तोशीरवारिणि ।
(अ.ह.सू. 3/33-36)

Day time should be spent in forests having tall trees reaching the sky such as Shala (shorea robusta), Tala – (Borassus flabellifera) etc., which obstruct the hot rays of the sun, or in houses around which bunches of flowers and grapes are hanging from their creepers. Sheets of cloth spreading sweet scented water, are arranged (to fan the air), all around. Sleep on soft bed prepared with flowers of Kadali (banana), Kalhara, Mrunala (lotus) etc. with fully blossomed flowers place all over or spend the day remaining inside the house cooled by water fountains, water being scented with Ushira, and thereby relieve yourself from the heat of the sun.

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Night regimen

निशाकरकरकीर्ण सौधपृष्ठे निशासु च ॥
आसना स्वस्थचित्तस्य चन्दनार्द्रस्य मालिनः ।
निवृत्तकामतन्त्रस्य सुसूक्ष्मतनुवाससः ॥
जलार्द्रास्तालवृन्तानि विस्तृताः पद्मिनीपुटाः ।
उत्क्षेपाश्च मृदूत्क्षेपा जलवर्षिहिमानिलाः ॥
कर्पूरमल्लिकामाला हाराः साहरिचन्दनाः ।
मनोहरकलालापाः शिशवः सारिकाः शुकाः ।
मृणालवलयाः कान्ताः प्रोत्फुल्लकमलोज्ज्वलाः ।
जङ्गमा इव पद्मिन्यो हरन्ति दयिताः क्लमम ।

(अ.ह.सू. 3/37-41)

At nights, one should sleep on the terrace having good moonlight. Exhaustion due to heat of the day is relieved by, anointing the body with paste of Candana , wearing garlands, avoidance of sexual activities, wearing of very light and thin dress, by fanning with fans made of leaves of Tala or large leaves of Padmini (lily) made wet; syringes sprinkling cool water softly, garlands of flowers of Karpura, Mallika and of pearls and beads of Harichandana (white sandal paste), children, Sarika (mynah bird) and Shuka (parrot) talking pleasantly; beautiful woman wearing bangles of soft lotus stalk, blossoms of lotus in their hair, moving about nearby.

Grishma Rutucahrya (Summer Season)

(References - Cha.Su.6/27-33)

मयूखैर्जगतः स्नेहं ग्रीष्मे पेपीयते रविः ।
स्वादु शीतं द्रवं स्निग्धमन्नपानं तदा हितम् ॥
शीतं सशर्करं मन्थं जाङ्गलान्मृगपक्षिणः ।
घृतं पयः सशाल्यन्नं भजन् ग्रीष्मे न सीदति ॥
मद्यमल्पं न वा पेयमथवा सुबहूदकम् ।
लवणाम्लकटूष्णानि व्यायामं च विवर्जयेत् ॥
दिवा शीतगृहे निद्रां निशि चन्द्रांशुशीतले ।
भजेच्चन्दनदिग्धाङ्गः प्रवाते हर्म्यमस्तके ॥
व्यजनैः पाणिसंस्पर्शैश्चन्दनोदकशीतलैः ।
सेव्यमानो भजेदास्यां मुक्तामणिविभूषितः ॥
काननानि च शीतानि जलानि कुसुमानि च ।
ग्रीष्मकाले निषेवेत मैथुनाद्विरतो नरः ॥

(च.सू. 6/27-32)

During the Grishma Rutu (summer), the essence of the world is excessively evaporate by heat of sun rays.

Pathya Ahara (wholesome diet) – intake of Madhura (sweet tasting foods), Sheeta (cool foods), Drava (liquid foods) Snigdha (oily, unctuous) foods and drinks are indicated. Cold Mantha (mashed fruits with sugar) Jangala Mriga Pakshi (meat of the animals or birds of windy climate), Ghruta (ghee) and (Paya) milk along with rice is considered as Pathya.

Apathya Ahara (unwholesome diet)- One should avoid taking Lavana (salt), Amla (sour), Katu (pungent) and Ushna (hot) food.

Avoid alcohol during summer – One should either drink alcohol in little quantity or should not drink at all. Even if someone consumes, it should be diluted with plenty of water.

Pathya Vihara (wholesome regimens) – Diva Sitagruhe (during day time one should sleep in an air cooled apartment), during night, after smearing body with sandalwood paste, one should sleep in open airy roof, which is cooled by moon rays. One should wear pearls. One should enjoy gardens, cold water and flowers during summer.

Apathya Vihara (unwholesome regimens)- Vyayama (Physical exercise) and Maithuna (sexual intercourse) should be avoided.

Varsha Rutu Charya- (Rainy Season)

(Ref. Cha.Su. 6/33-40, Bha.Pra. 5/322-325, Su.Su. 6/33-34, Yo. Ra. Rutucharya Adhyaya)

आदानग्लानवपुषामग्नि सन्नोऽपि सीदति ।
वर्षासु दोषैदुष्यन्ति तेऽम्बुलम्बाम्बुदेऽम्बरे ॥
स्तुषारेण मरुता सहसा शीतलेन च ।
भूबाष्पेणाम्लपाकेन मलिनेन च वारिणा ॥
वह्निनैव च मन्देन, तेष्वित्यन्योऽन्यदूषिषु ।
भजेत्साधारणं सर्वमूष्मणस्तेजनं च यत ॥

(अ.ह.सू. 3/42-44)

In rainy season, the Agni (digestive activity) is weak. It is already debilitated by Adana Kala; it undergoes further decrease and gets vitiated by the Doshas. The Doshas get aggravated by the effect of thick clouds full of water, cold wind having snow, dirty water because of rain, warmth of the earth and sourness. The poor strength of digestive activity the Doshas start vitiating one another and cause many diseases. Hence all general measures

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to mitigate imbalanced Doshas and to improve digestive activity should be adopted.

आस्थापनं शुद्धतनुर्जीर्णं धान्यं रसान कृतान।
जाङ्गलं पिशितं यूषान मध्वरिष्टं चिरन्तनम॥
मस्तु सौवर्चलाढ्यं वा पञ्चकोलावचूर्णितम।
दिव्य कौपं शतं चाम्भो भोजनं त्वतिदुर्दिने॥
व्यक्ताम्ललवणस्नेहं संशुष्कं वशौद्रवल्लघु।
(अ.ह.सू. 3/45-46)

One should undergo purifactory therapies (Panchakarma). After that the person should also be administered Asthapana Basti (decoction enema therapy). He should use old grains for food, meat juice processed with spices etc. Meat of animals of desert-like lands, soup of pulses, wine prepared from grapes and fermented decoctions, which are old or Mastu (whey, thin water or curds) processed with more of Souvarcala (Sochal salt) and powder of Panchakola, should be used. Rain water or water from deep wells, well boiled should be used for drinking. On days of no sunlight at all, the food should predominantly Amla, Lavan and Fatty, dry, mixed with honey and easily digestible.

अपादचारी सुरभिः सततं धूपिताम्बरः।
इर्म्यपृष्ठे वसेद्वाष्पशीतशीकरवर्जिते॥
(अ.ह.सू. 3/47)

Person should not move about on foot (move only on vehicles), should use perfumes, expose his clothes to fragrant fumes and dwell in upper stories of the house, devoid of heat, cold and snow.

नदिजलोदमन्थाहः स्वप्नायासातपांस्त्यजेत।
(अ.ह.सू. 3/48)

Avoid : River water, Udamantha (beverage prepared with flour of corns mixed with ghee), sleeping at daytime, exertion and exposure to Sun should be avoided.

Varsha Rutu Charya- (Rainy Season)

(Ref. Cha.Su. 6/33-40)

आदानदुर्बले देहे पक्ता भवति दुर्बलः।
स वर्षास्वनिलादीनां दूषणैर्बाध्यते पुनः॥
भूवाष्पान्मेघनिस्यन्दात् पाकादम्लाज्जलस्य च।
वर्षास्वग्निबले क्षीणे कुप्यन्ति पवनादयः॥
तस्मात् साधारणः सर्वो विधिर्वर्षासु शस्यते।
उदमन्थं दिवास्वप्नमवश्यायं नदीजलम्॥
व्यायाममातपं चैव व्यवायं चात्र वर्जयेत्।
पानभोजनसंस्कारान् प्रायः क्षौद्रान्वितान् भजेत्॥
व्यक्ताम्ललवणस्नेहं वातवर्षाकुलेऽहनि।
विशेषशीते भोक्तव्यं वर्षास्वनिलशान्तये॥
अग्निसंरक्षणवता यवगोधूमशालयः।
पुराणा जाङ्गलैर्मांसैर्भोज्या यूषैश्च संस्कृतैः॥
पिबेत् क्षौद्रान्वितं चाल्पं माध्वीकारिष्टमम्बु वा।
माहेन्द्रं तप्तशीतं वा कौपं सारसमेव वा॥
प्रघर्षोद्वर्तनस्नानगन्धमाल्यपरो भवेत्।
लघुशुद्धाम्बरः स्थानं भजेदक्लेदि वार्षिकम्॥
(च.सू. 6/33-40)

Digestive fire weakened during Adana Kala is further weakened during Varsha Rutu (rainy season) and due to aggravation of Vata along other Doshas. In this season Bhubaspa (vapored produced due to rain fallen the heated earth) causes Tridosha Prakopa (aggravation), Meghanisyandana (rain fall) causes aggravation of Vata and Kapha and Amlapaka of Jala aggravates Pitta and Shlema. Hence Sadharana Vidhi (moderate diet and regimens) are prescribed for Varsha Rutu.

Pathya Ahara (wholesome diet) - Ksaudranavita Ahara (one should generally use honey in preparing diets, drinks and others. If the days are cooler due to heavy rains with storms, one should take such of the diets as are Amla (sour), Lavana (salty) and Sneha (unctuous); this serves as an counteract to the vitiation of Vata during this season. In order to maintain normal digestion strength, one should take Purana Yava (old barley), Godhuma (wheat) and Shali (rice), Jangala Mamsa (meat of animals from arid region). It should be processed with Yusha (vegetables soup). Madhvika or Aristhta (alcoholic preparation) along with honey and water should be consumed.

Mahendra Jala (Pure rain water), Kaupa Jala (water from the well or pond), Taptashita Jala (boiled and cooled) mixed with little honey should be consumed.

Apathya Ahara (unwholesome diet) - The water gains sour taste due to clouds, cold wind and mist. One should avoid Udamantha (Udaka Pradhana Mantha - beverage prepared with flour

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of corns mixed with ghee), Nadi Jala (water from river).

Pathya Vihara (wholesome regimens) - Pragharshana (massage body with palm), Udvartana (powder massage), Snana (bath), Gandhamala Dharana (wear fragrant garlands). One should wear Laghu (light) and Shuddha (clean) cloth and should reside Akledi Sthana (in a house devoid of humidity).

Apathya Vihara (unwholesome regimens) - Divasvapna (day sleep), Vyayama (exercise), Atapa (exposure to sunlight) and Vyavaya (sex).

Pravrut Rutu Charya

(Ref. Su. U. 64/46-54, Su.Su. 6/31-32)

प्रावृष्यम्बरमानद्धं पश्चिमानिलकर्षितैः ।
अम्बुदैर्विद्युदुद्द्योतप्रस्तुतैस्तुमुलस्वनैः ॥
कोमलश्यामशष्पाढ्या शक्रगोपोज्ज्वला मही ।
कदम्बनीपकुटजसर्जकेतकभूषिता ॥

(सु.सू. 6/31-32)

तापात्यये हिता नित्यं रसा ये गुरवस्त्रयः।
पयो मांसरसाः कोष्णास्तैलानि च घृतानि ॥
बृंहणं चापि यत्किञ्चिदभिष्यन्दि तथैव च ।
निदाघोपचितं चैव प्रकुप्यन्तं समीरणम् ॥
निहन्यादनिलघ्नेन विधिना विधिकोविदः ।
नदीजलं रूक्षमुष्णमुदमन्थं तथाऽऽतपम् ॥
व्यायामं च दिवास्वप्नं व्यवायं चात्र वर्जयेत् ।
नवान्नरूक्षशीताम्बुसक्तूंश्चापि विवर्जयेत् ॥
यवषष्टिकगोधूमान् शालीश्चाप्यनवांस्तथा ।
हर्म्यमध्ये निवाते च भजेच्छय्यां मृदूत्तराम् ॥
सविषप्राणिविण्मूत्रलालादिष्टीवनादिभिः ।
समाप्लुतं तदा तोयमान्तरीक्षं विषोपमम् ॥
वायुना विषदुष्टेन प्रावृषेण्येन दूषितम् ।
तद्धि सवीपयोगेषु तस्मिन् काले विवर्जयेत् ॥
अरिष्टासवमैरेयान् सोपदंशांस्तु युक्तितः ।
पिबेत् प्रावृषि जीर्णांस्तु रात्रौ तानपि वर्जयेता ॥
निरूहैर्बस्तिभिश्चान्यैस्तथाऽन्यैर्मारुतापहैः ।
कुपितं शमयेद्वायुं वार्षिकं चाचरेद्विधिम् ॥

(सु.उ.64/46-54)

During Tapatyaya (end of summer or early rainy season) things of three heavy tastes (Madhra, Amla and Lavana) are always beneficial. So also warm Paya (milk), Mamsa Rasa (meat soup), Taila (oil) and Ghrita (ghee), things which stouten the body and increase moisture inside the body are beneficial to mitigate Vata aggravated during summer. It should be mitigated by resorting to other therapies by the physician knowing procedures.

River water things which are Ruksha (dry) and Ushna (hot), Udamantha (Saktu), Atapa (exposure to sunlight), Vyayama (physical activities), Divaswapna (day sleep), Vyavaya (sexual intercourse) should be avoided. So also Navanna (freshly harvested grains), Rukshan (dry) and Shita (cold foods), Shita Ambu (cold water) and Saktu (flour of grains) are avoided.

Persons should take food prepared from Yava, Shastika, Godhuma and Shali, reside inside a house devoid of breeze, or in shade which is soft and comfortable; since in this season rain water is contaminated by excreta, urine, saliva and spittle of poisonous animals, since it is also polluted with poisonous breeze, it similar to poison; hence this water should be avoided for all kinds of use; Arishta, Asava and Maireya may be consumed along with condiments during day and nights even these should be avoided.

The aggravated Vata should be mitigated by administering Niruha Basti (decoction enema) and other therapy mitigates Vata and adopting the regimen of Varsha Rutu.

Sharad Rutucharya (Autumn Season)

(Ref. Cha.Su.6/41-48, Bha. Pra. 5/326, Su.Su. 6/35-36, Yo. Ra. Rutucharya Adhyaya)

वर्षाशीतोचिताङ्गानां सहसैवार्करश्मिभिः ।
तप्तानां सञ्चितं वृष्टौ पित्तं सरदि कुप्यति ॥
तज्जयाय घृतं तिक्तं विरेको रक्तमोक्षणम ।

(अ.हृ.सू. 3/49)

The person becomes accustomed to the cold of Varsha Rutu (rainy season). When he gets suddenly exposed to the warm rays of Sun, the Pitta, which has undergone increase in Varsha (rainy season) becomes greatly aggravated during Sharad (autumn). In order to get over it, Tikta-Ghrita (medicated ghee

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recipe described in the treatment of Kustha chapter 19 of Chikitsa Sthana), purgation therapy and bloodletting should be resorted to.

तिक्तं स्वादु कषायं च क्षुधितोऽन्नं भजेल्लघु ।
शालिमुद्ग सिताधात्रीपटोलमधुजाङ्गलम ॥
(अ.ह.सू. 3/50)

When hungry, the person should take foods which are of bitter, sweet and astringent tastes, and easily digestible such as Shali (Rice), Mudga (green gram), sheeta (sugar), Amalaki, Patola, Madhu (honey) and meat of animals of desert-like lands.

Hamsodaka

तप्तं तप्तां शुकिरणैः शीतं शीतांशुरश्मिभिः ।
समन्तादपुअहोरात्रमगस्त्योद्यानिर्विषम ।
शुचि हंसादकं नाम निर्मल मलजिज्जलम ॥
नाभिष्यन्दि न वा रुक्षं पानादिष्वमृतोपमम ॥
(अ.ह.सू. 3/51-52)

The water which gets heated by the hot rays of the sun during day cooled by the cool rays of the moon during night, for many days continuously, which has been de-poisoned (detoxicated) by the rise of the star Agastya, which is pure, uncontaminated and capable of mitigating the malas (doshas) is known as Hamsodaka. It is neither Abhisyandi (producing more secretionor moisture inside the minute channels so as to block them) nor dry, such water is like Amrita (nectar) for drinking and other purpose.

चन्दनोशीरकर्पूरमुक्तास्स्रग्धसनोज्ज्वलः ॥
सौधेषु सौधधवलां चन्द्रिकां रजनीमुखे ।
(अ.ह.सू. 3/53)

Evening should be spent on the terraces of houses which are white (by painting), anointing the body with the paste of Chandana, Ushira and Karpura, wearing garlands of pearls and shining dress and enjoying the moonlight.

तुषारक्षारसौहित्य दधितैलवसातपान ॥
तीक्ष्णमद्यादिवास्वप्नपुरोवातान परित्यजेत ।
(अ.ह.सू. 3/54)

Avoid : Exposure to snow (mist), indulgence in Kshara (alkaline substances), satiation with hearty meal, use of Dadhi (curds), oil, Vasa (muscle fat), exposure to sunlight, strong liquors, sleeping at day time and the eastern breeze.

Sharad Rutucharya (Autumn Season)

(Ref. Cha.Su.6/41-48)

वर्षाशीतोचिताङ्गानां सहसैवार्करश्मिभिः ।
तप्तानामाचितं पित्तं प्रायः शरदि कुप्यति ॥
तत्रान्नपानं मधुरं लघु शीतं सतिक्तकम् ।
पित्तप्रशमनं सेव्यं मात्रया सुप्रकाङ्क्षिणैः ॥
लावान् कपिञ्जलानेणानुरभ्राञ्छरभान् शशान् ।
शालीन् सयवगोधूमान् सेव्यानाहुर्घनात्यये ॥
तिक्तस्य सर्पिषः पानं विरेको रक्तमोक्षणम् ।
धाराधरात्यये कार्यमातपस्य च वर्जनम् ॥
वसां तैलमवश्यायमौदकानूपमामिषम् ।
क्षारं दधि दिवास्वप्नं प्राग्वातं चात्र वर्जयेत् ॥
दिवा सूर्यांशुसंतप्तं निशि चन्द्रांशुशीतलम् ।
कालेन पक्वं निर्दोषमगस्त्येनाविषीकृतम् ॥
हंसोदकमिति ख्यातं शारदं विमलं शुचि ।
स्नानपानावगाहेषु हितमम्बु यथाऽमृतम् ॥
शारदानि च माल्यानि वासांसि विमलानि च ।
शरत्काले प्रशस्यन्ते प्रदोषे चेन्दुरश्मयः ॥
(च.सू. 6/41-48)

The body parts accustomed to Sita (cold) of Varsha Rutu get suddenly get exposed to Arka Rasmi (heat of the sun rays) leading to Pitta Prakopa(aggravation of Pitta).

Pathya Ahara (wholesome diet)- In this season, Madhura (sweet), Laghu (light), Sita (cold) and Tikta Rasa (bitter) foods and drinks should be taken so as to subside Pitta Dosha. One should have Meat of Lava (common quail), Kapinjala (grey partridge), Ena (Antelope), Urabhara (sheep), Sharabha (Wapiti), and Shasha (Rabbit), Shali (rice), Yava (barley) and Godhuma (wheat) and Tikta Sarpisha Pana (intake of ghee processed with bitter herbs).

Apathya Ahara (Unwholesome diet)

Vasa (fat), Taila (oil) and Audaka and Anupa Mamsa (aquatic and marshy animals), Kshara (alkaline) and Dadhi (curds).

Hamsodaka – water heated by Suramsu (sun rays) during day time and cooled by Candramsu (moonlight) at night, matured by Kala (time) and detoxified by Agastya Naksatra is known as Hamsodaka. It is Vimala (clear) and Suchi (pure). Hamsodaka is like Amrit (nectar) when used for

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Snana (bath), Pana (drink) and Avagaha (tub bath).

Pathya Vihara (wholesome regimens) – Virechana (Purgation therapy),

Raktamokshana (bloodletting are advised, Mala Dharana (wearing garland), Pradoshe Indurasmi (exposure to moon light). By the Prabhava of all these Pitta Dosha get reduce.

Apathya Vihara (unwholesome regimens)

One should avoid Atapa (sun bath), Divaswapna (should not sleep during day time) and one should not expose himself to frost and east wind.

Hamsodaka – The water is exposed to the heat during day and moonlight during night. It is also purified and detoxified by Agastya star. Such water is known as Hamsodaka. It is very clear and is good for bathing, swimming and drinking.

Amshudakam

दिवसेऽर्ककरैर्जुष्टं निशि शीतकरांशुभिः ।
ज्ञेयमंशूदकं नाम स्निग्धं दोषत्रयापहम ॥
(भा.प्र. दिनचर्या 5/348)

Water is exposed day time in sun ray and in right moon light called Amshudakam. It is Snigdha and Tridoshanashaka property.

Use of taste as per season in different Rutus

शीते वर्षासु चाद्यां स्त्रीन वसन्तेऽन्त्यान रसान्भजेत ।
स्वादं निदाघे, शरदि स्वादु तिक्त कषायकान ।
शरद्वसन्तयो रुक्षं शीत घर्मगनान्तयोः ।
(अ.ह.सू. 3/56)

During winters (Hemanta and Sisira) and varsa (rainy season), Madhura, Amla and Lavan tastes should be especially used.

Katu, Tikta and Kashaya Rasa should be used more during Vasanta (spring season).

Madhura Rasa should be used more during Nidagha or Grishma (summer).

Madhura, Tikta and Kashaya Rasa should be used during Sharad (autumn).

Qualities of food as per season

अन्नपानं समासेन विपरीतमतोऽन्यदा ॥ (अ.ह.सू. 3/56)

The food and drink should be dry (moisture less, fat-less) during Sharad and Vasanta (autumn and spring) and food should be cold during Gharma (Grishma or summer) and Ghnanta (Varsha or end of rainy season) and should be hot in other seasons.

नित्यं सर्वरसाभ्यासः स्वस्वाधिक्यमृतावृतौ ।
(अ.ह.सू. 3/57)

The habit of using all the six tastes every day is ideal for maintenance of health. Except, during particular special seasons, when the particular tastes suitable to the respective seasons.

Importance of Ahara and Vihara in Ritu Sandhi and Yamadanshtra Kala

Rutusandhi (Inter-Seasonal Period) (Ref-A.H. Su 3/58, A.S. Su.4/21)

ऋत्वोरन्त्यादिसप्ताहावृतुसन्धिरिति स्मृतः ।
तत्र पूर्वो विधिस्त्याज्यः सेवनीयोऽपरः क्रमात ॥
असात्मजा हि रोगाः स्युः सहसा त्यागशीलनात ॥
(अ.ह.सू. 3/58-59)

The seven days at the end and commencement of a season is known as Rutu Sandhi (inter seasonal period). During this period, the regimen of the preceding season should be discontinued gradually and that of the succeeding season should be gradually adopted; sudden discontinuance or sudden adoption gives rise to diseases caused by Asatmya (non-habituation).

Yamadamsthra (Refer- Sha. Sam. Pu.Kha.2/29)

कार्तिकस्य दिनान्यष्टवष्टावाग्रयणस्य च ।
यमद्रंष्ट्रा समाख्याता स्वल्पभुक्तो हि जीवति ॥
(शा.सं. 2/29)

The eight days of Kartika Masa (third week of November) and first eight days of Agrahayana (fourth week of November) are known as Yamadamstra Kala. During this period one can be healthy if he takes only small quantities of food.

Importance of Rutucharya

ऋतुष्वेषु य एतैस्तु विधिभिर्वर्तते नरः ।
दोषानृतुकृतान्नैव लभते स कदाचन ॥
(यो.र. 2)

If one follow the regimens prescribed under each and every Rutu (season) such person is never

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inflicted with seasonal diseases or disorders and he always remains as a healthy person.

चयकोपशमा यस्मिन्दोषां सम्भवन्ति हि ।
ऋतुषटकं तदाख्यातं रवे राशिषु संक्रमात ॥
(भा.प्र. दिनचर्यादि प्रकरण)

The movement of sun from one Rasi to the other is known as Rutu cycle of six seasons. Chaya (mild increase), Kopa (more increase) and Sama (decrease to normal) of Doshas occur in this cycle.

तस्याशिताद्यादाहारद्वलं वर्णश्च वर्धते ।
यस्यर्तुसात्म्यं विदितं चेष्टाहारव्यपाश्रयम ॥
(च.सू. 6/3)

One who knows the suitable diet and regimens for every season and practices accordingly are enhancing the strength and lustre.

ऋतावृतौयएतेनविधिनावर्ततेनरः ।
घोरानृतुकृतान रोगान्नान्योति सकदाचन ॥
(सु.उ. 64/55)

The person who adheres to these regimens in and out of seasons does not become a victim of dreadful diseases caused by season.

Rituharitaki as a Rasayana with Research Updates

Rutu Haritaki-(Refer- Bha. Pra. Ni Haritakyadi Varga)

सिंधूत्थशर्कराशुण्ठीकनामधुगुडैः क्रमात ।
वर्षादिष्वभया प्राश्या रसायनगुणषिणा ॥
(भा.प्र.नि. हरितक्यादिवर्ग)

It is classically recommended as Rutu Haritaki for using the drug during the course of different season's viz.,

- Varsha (rains) - Saindhava Lavana (Rock salt)
- Sharad Rutu (autumn) - Sharkara (sugar)
- Hemanta (cold/winter) - Shunti (Dry Ginger)
- Shishira (late winter & early spring) - Pippali (long pepper)
- Vasanta (spring) - Madhu (honey) and
- Grishma (summer) - Guda (Jaggery).

Shishira Rutu Haritaki- In Shishir Rutu environment remains cold and windy. The strength of the person remains less in the season, deposition of the Kapha Dosha happens and Agni remains in a higher state. Rutu Haritaki in this season to eliminate Kapha, Haritaki should be taken with Pippali (piper longum). Pippali have Katu Rasa pacifies Kapha and due to Snigdha Guna pacifies Vata.

Vasanta Rutu Haritaki- In Vasant Rutu due to increases temperature Kapha dilutes and Agni. In this season Haritaki should be taken with Madhu. Madhu having Ruksha Guna and Katu Vipaka pacifies Kapha.

Grishma Rutu Haritaki- Grishma Rutu is last Rutu of Adana kala. In Grishma Rutu Haritaki is used with Guda. Guda has Snigdha property so it pacifies Rukshata of body and Sheeta in Virya balances the warmness of Haritaki. Guda itself increases the Kapha, Krimi and Meda Dhatu.

Varsha Rutu Haritaki- Varsha Rutu is first Rutu of Visarga kala. Saindhava Lavana improves Jatharagni and pacifies the Vata Dosha.

Sharad Rutu Haritaki - According to Bhav Prakash in Sharad Rutu Haritaki should be taken with Sharkara. In Bhavprakasha Samhita explained that Haritaki should be taken in the form of powder with Sharkara in this season and pacifies the Pitta Dosha.

Hemanta Rutu Haritaki- In Hemant Rutu Haritaki should be taken with Shunthi. Haritaki and Shunthi both having Ushna Virya, Ruksha in Guna they prevent accumulation of Kapha Dosha and due to Madhura Vipaka both pacifies the Pitta.

Research Updates

Efficacy of Rutuharitaki (Seasonal adjuvant of Haritaki) on disorders of Varsha Ritu (monsoon) w.s.r. to quality of life: An open labelled randomized controlled clinical trial- Monsoon epidemics are always a serious concern in the public health sector. Administration of Haritaki with suitable vehicle as per season (Rutuharitaki) is a simple, cost-effective preventive measure which can be used for such conditions. In the present study, Haritaki has been used which may have acted as Rasayana which was found to

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be effective in breaking the chain reaction of free radicals and reduced the lipid peroxidation. Haritaki with its Tridosha Shamana (pacifies Tridosha), Agnivardhana (increases digestive power) and Rasayana action might have reduced the incidence of common cold, cough and fever in the trial group compared to the control group. Rutuharitaki is found to be effective in reducing severity and frequency of diseases in Varsha Ritu and had effect on quality of life of patients.

Effects of Rituviparyaya on Health and its Relation to Janapadaudhwamsa/ maraka Vyadhis With Present Day Examples

Rutuviparyaya- (Refer- Cha.Vi.3/6/4, Su.Su.6/16-17, 19-20, 38, Bha. Pra. 5)

चयकोपशमान्दोषा विहाराहारसेवनैः ।
समानैर्यान्त्यकालेऽपि विपरीतैर्विपर्ययम् ॥

(भा.प्र. 5 दिनचर्या प्रकरण)

Dosha undergoes Chaya, Prakopa and Prashamana by indulgence in foods, activities etc. which are similar to them even apart from the seasons, and indulgence in foods, activities of dissimilar qualities produce opposite effect even during right time.

कालं तु खलु यथर्तुलिङ्गाद्विपरीतलिङ्गमतिलिङ्गं हीनलिङ्गं चाहितं व्यवस्येत् । (च .वि. 3/6/4)

The unwholesome time is that which in contrary, excessive or deficient features to those of regular season.

Avyapanna Rutu (Unvitiated/Normal seasons)- When the Rutus (seasons) are not abnormal (i.e., the seasons are normal - exhibiting their usual features) they are called as Avyapanna Rutus i.e., uncontaminated / normal seasons. In these seasons, both plants and water will also be normal (having their normal qualities). By their use, life activity, span of life, strength, vigour and vitality of men and animals become augmented.

Rutu Vyapat (Abnormality of seasons)- The abnormalities of seasons are caused by Adrista (non-righteousness, adharma). The abnormalities occurring in cold, heat, wind and rain will also cause abnormalities in plants, medicines and water. (Herein cold, heat, wind and rain will become different and have abnormal qualities other than their normal qualities. The same is true with plants and water.)

By use of these plants and water, many kinds of diseases or pandemics / epidemics are caused. When the seasons are contaminated and cause different diseases and epidemics, the plants (medicines) and water which are not contaminated shall be used (for treatment, as remedies).

Rutu Vyapat (Diseases caused due to vitiated/ abnormal seasons) - Sometimes in spite of the seasons not being contaminated/ vitiated i.e., seasons being normal, communities (of man and other living beings) suffer and get destroyed by the effects of sorcery, curses, anger of evil spirits (demons) and unrighteous behaviour of the people. Sometimes, the country would get vitiated by the smell of poisonous plants and flowers carried by the wind. The people living in such countries become affected by diseases like cough, dyspnoea, vomiting, nasal catarrh, headache, fever etc. which are not different from the dosha prakriti (constitution of the body). Other times one would suffer from diseases caused due to the bad effects (inauspicious effects) of planets and stars. Also, sometimes diseases are manifested due to the effects of malevolent qualities of the house, wife, cot, seat (furniture), vehicles, riding animals, precious stones, gems and household equipment etc. Diseases may also be caused due to many other signs which would suggest inauspiciousness (ominous signs).

Vyapanna Rutucharya (Regimen during abnormal seasons)

At such times, people should resort to one or all of the below mentioned remedies -

1. Sthana Parityaga - change of place of living (migrate to other places),
2. Shanti karma - pacificator rites
3. Prayaschitta - expiatory activities
4. Mangala - auspicious rituals

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5. Japa - chanting of hymns
6. Homa - fire sacrifices
7. Upahara oblations to Gods
8. Yajna - special fire sacrifices
9. Baddanjali Namaskara - prostration to deities with folded hands
10. Tapa - doing penances
11. Niyama - observing vows and restraints
12. Daya -showing compassion
13. Dana- giving charity
14. Deeksha - getting initiated by preceptors and
15. Abhyupagama Devata Brahmana Gurubha-vaih Bhavitavyam - remaining in the company of Gods, Brahmanas and preceptors (and carrying out their mandates.

MCQ on Rutucharya

1. The_____ Rutu form the Uttarayana
   A] Varsha, Sharada and Hemanta
   B] Sharada, Vasanta and Hemanta
   C] Shishira, Vasanta and Grishma
   D] Shishira, Hemanta and Sharada
2. The _____Rutu form the Dakshinayana
   A] Varsha, Sharad and Hemanta
   B] Shishira, Vasanta and Grishma
   C] Shishira, Hemanta and Sharad
   D] Sharad, Vasanta and Hemanta
3. Dakshinayana or Visargakala commences with _____ Rutu.
   A] Varsha B] Sharad
   C] Hemanta D] Grishma
4. Uttarayana or Adanakala commences with _____ Rutu.
   A] Varsha B] Sharad
   C] Shishira D] Grishma
5. Shishira, Vasanta and Grishma form the _____.
   A] Uttarayana B] Dakshinayana
   C] Rutu Sandhi D] All of these
6. Varsha, Sharad, Hemanta form the _____.
   A] Uttarayana B] Dakshinayana
   C] Rutu Sandhi D] All of these
7. Sweet, Sour and Salt tastes should be used in the _____Rutu.
   A] Hemanta B] Shishira
   C] Sharad D] Grishma
8. Sour and Sweet tastes should be avoided during _____Rutu.
   A] Hemanta B] Shishira
   C] Vasanta D] Grishma
9. Foods which are Sweet in taste should be consumed in _____ Rutu.
   A] Grishma B] Vasanta
   C] Hemanta D] Sharad
10. _____ should be consumed during Sharad Rutu.
    A] Hamsodaka B] Jaggary water
    C] Honey water D] Cold Water
11. The habit of using _____tastes everyday is ideal except during special seasons.
    A] One B] Two
    C] Four D] Six
12. The last seven days of a season the first seven days of the next season is known as _____.
    A] Uttarayana B] Dakshinayana
    C] Rutu sandhi D] SandhikalA)
13. The strength of the people will be maximum during_____ Rutu.
    A] Shishira B] Vasanta
    C] Grishma D] Varsha
14. The strength of the people will be maximum during_____ Rutu.
    A] Hemanta B] Vasanta
    C] Grishma D] Varsha
15. The strength of the agni will be maximum during____Rutu.
    A] Shishira B] Vasanta
    C] Grishma D] Varsha
16. The strength of the agni will be maximum during_____ Rutu.
    A] Hemanta B] Vasanta
    C] Grishma D] Varsha
17. Murdha Taila should be used in _____ Rutu.
    A] Hemanta B] Vasanta
    C] Grishma D] Varsha

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18. Old yava, Godhuma and honey should be consumed as food in_____Rutu.
A] Vasanta B] Hemanta
C] Grishma D] Varsha

19. The flour of Wheat, Black gram, products of Sugarcane and milk should be consumed as food in _____ Rutu.
A] Vasanta B] Hemanta
C] Grishma D] Varsha

20. Panaka Pachasara should be consumed in_____ Rutu.
A] Vasanta B] Hemanta
C] Grishma D] Varsha

21. Mastu processed with more of souvarcala and powder of pachakola should be used in _____ Rutu.
A] Vasanta B] Hemanta
C] Grishma D] Varsha

22. Shali, Mudga, Sita, Dhatri, Patola, Honey and meat of animals of desert- like lands should be consumed as food in _____ Rutu.
A] Vasanta B] Hemanta
C] Grishma D] Sharada

23. आदानम्_____।
A] सौम्यम् B] आग्नेयम्
C] बृंहणम् D] स्निग्धम्

24. _____ rasa is powerful in Varsha Rutu.
A] Madhura B] Amla
C] Lavana D] Katu

25. _____ rasa is powerful in Sharad Rutu.
A] Madhura B] Amla
C] Lavana D] Katu

26. _____ rasa is powerful in Hemanta Rutu.
A] Madhura B] Amla
C] Lavana D] Katu

27. _____ rasa is powerful in Shishira Rutu.
A] Katu B] Tikta
C] Kashaya D] Lavana

28. _____ rasa is powerful in Vasanta Rutu.
A] Katu B] Tikta
C] Kashaya D] Lavana

29. _____ rasa is powerful in Grishma Rutu.
A] Katu B] Tikta
C] Kashaya D] Lavana

30. Uttarayana is also known as_____ kala
A] Adana B] Visarga
C] Rutu Sandhi D] Balya

31. In Adana kala the following properties become strong
A) Tiksna, usna, ruksha
B) Manda, sita, snigdha
C) Tiksna, sita, snigdha
D) Manda, sita, snigdha

32. In adana kala the—— rasas becomes stronger
A) Tikta, Kashaya, katu
B) Tikta, katu, Kashaya
C) Kashaya, katu, tikta
D) Katu, Kashaya, tikta

33. During Hemanta —— is the state of Dosha
A) Kapha sanchaya, pitta prasama
B) Pitta sanchaya, kapha prakopa
C) Pitta prasama, kapha prakopa
D) Kapha prakopa, vata prasama

34. During Grishmakala——is the state of Dosha
A) Vata sanchaya, kapha prasama
B) Pitta sanchaya, vata prakopa
C) Kaphasanchaya, vata prakopa
D) Kaphasanchaya, vataprasama

35. During Varsha kala——is the state of Dosha
A) Pitta sanchaya, vata prakopa
B) Pitta prakopa, vata sanchaya
C) Vata sanchaya, kapha prakopa
D) Vata prakopa, kapha sanchaya

36. The body has maximum strength in
A) Hemanta, Shishira
B) Vasanta, Sharad
C) Varsha, Grishma
D) Hemanta Grishma

37. The body has moderate strength in
A) Hemanta, Shishira
B) Vasanta, Sharad
C) Varsha, Grishma
D) Hemanta Grishma

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38. The body has minimum strength in
A) Hemanta, Shishira
B) Vasanta, Sharad
C) Varsha, Grishma
D) Hemanta, Grishma

39. The Rasa to be consumed in Hemanta are
A) Madhura, amla, lavana
B) Katu, tikta, Kashaya
C) Madhura, katu, Kashaya
D) Tikta, lavana, Kashaya

40. Abhyanga, murdhataila, padaghata and vimardana are advised in
A) Hemanta B) Vasanta
C) Sharad D) Varsha

41. During Hemanta after Vyayama one should take bath using drugs of—— Rasa
A) Tikta B) Kashaya
C) Katu D) Amla

42. Following are pathya in Hemanta EXCEPT
A) Godhuma B) Vasa
C) Purana annam D) Ikshu

43. The garments namely Kauseya, Praveni and Kauthapa are mentioned in — Rutu
A) Hemanta B) Sharad
C) Varsha D) Grishma

44. The regimen of Hemanta does NOT include
A) Fasting B) Massage
C) Sunbath D) Wrestling

45. During Vasanta all measures are taken to pacify
A) Kapha B) Vata
C) Pitta D) Tridosha

46. The regimen of Vasanta does NOT include
A) Vamana B) Virechana
C) Nasya D) Udvartana

47. The property of diet in Vasanta is
A) Laghu, ruksha B) Snigdha, laghu
C) Tikshna, usnam D) Mandam, si ta

48. The following are pathya in Vasanta EXCEPT
A) Purana yava B) Vasa
C) Jangala mamsa D) Arista

49. During Vasanta water boiled with ——— is/ are advised for drinking
A) Sringvera B) Musta
C) Sara D) All the above

50. ——— Rasa are to be avoided in Vasanta Rutu
A) Madura, amla B) Katu tikta
C) Kashaya, lavana D) Tikta, Kashaya

51. The following Rasa are strictly contraindicated in Vasanta
A) Guru, sita, snigdha
B) Laghu, usna, snigdha
C) Laghu, sita, tikshna
D) Guru, usna, tikshna

52. ——— is contraindicated in Vasanta
A) Vyayama B) Divaswapna
C) Vamana D) Nasya

53. Food taken in Grishma should be
A) Madhura, laghu, snigdha, sita, hima, drava
B) Amla, guru, snigdha, sita, hima, drava
C) Madhura, guru, snigdha, sita, hima, drava
D) Amla, laghu, snigdha, sita, hima, drava

54. Lavana, katu, amla rasa are to be strictly avoided in
A) Vasanta B) Grishma
C) Hemanta D) Varsha

55. In Grishma Rutu
A) Day sleep allowed, alcohol not allowed
B) Alcohol allowed, day sleep not allowed
C) Both alcohol and day sleep not allowed
D) Both alcohol and day sleep allowed

56. Moha, saitilya, sopha, daha are the complication of —in Grishma
A) Madyapana B) Divaswapna
C) Vyayama D) Ratijagarana

57. Rasa, Rasala, Raga and Khandava are advised to be taken in
A) Grishma B) Hemanta
C) Sharad D) Varsha

58. Pancasaram/panakam is advised in
A) Grishma B) Hemanta
C) Sharad D) Varsha

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59. Sasankakirana is advised in
A) Grishma B) Hemanta
C) Sharad D) Varsha

60. The ————milk is specially preferred in Grishma
A) Cow milk B) Goat milk
C) Buffalo milk D) Camel milk

61. Amlavipaka is the characteristic feature of
A) Grishma B) Varsha
C) Sharad D) Vasanta

62. The —— is NOT among the pathya of Varsha Rutu
A) Nava anna B) Purana anna
C) Yusha D) Jangala mamsa

63. Mastu mixed with Sauvarcala or pancakola choorna is recommended in
A) Grishma B) Varsha
C) Vasanta D) Hemanta

64. Sour and salty food mixed with snehadravya, madhu is advocated in
A) Rainy days with heavy downpour
B) Rainy days with less rainfall
C) Sunny days with cool breeze
D) Sunny days with humidity

65. —— is to be avoided in Varsha Rutu
A) Mantha B) Fumigation
C) Footwear D) Perfumes

66. ———— is NOT to be avoided in Varsha Rutu
A) Footwear B) Sunbath
C) Day sleep D) Exertion

67. Hamsodaka is the speciality of
A) Sharad B) Vasanta
C) Varsha D) Grishma

68. — is NOT among the pathya of Sharad Rutu
A) Curd B) Sugar
C) Jangala mamsa D) Honey

69. Sunbath is contraindicated in
A) Varsha and Vasanta
B) Vasanta and Grishma
C) Varsha and Sharad
D) Vasanta and Sharad

70. Goose berry is specially indicated in
A) Varsha B) Vasanta
C) Grishma D) Sharad

71. Choose the correct sequence
A) Tushara, dadhi, vasa and mudga are apathya in Sharad
B) Ksara, dadhi, jangala mamsa, tikshna madya are apathya in Sharad
C) Dadhi, amlaki, patola are apathya in Sharad
D) Tushara, dadhi, vasa, tikshna madya are apathya in Sharad

72. Madhura, tikta and Kashaya rasa are advised in
A) Sharad B) Grishma
C) Varsha D) Vasanta

73. Madhura rasa is useful in all Rutu EXCEPT
A) Hemanta B) Vasanta
C) Grishma D) Sharad

74. Amla rasa is desirable in
A) Shishira, Varsha, Hemanta
B) Shishira, Vasanta, Grishma
C) Varsha, Vasanta, Grishma
D) Varsha, Shishira, Hemanta

75. Snigdha and usna properties are desirable in
A) Shishira, Varsha, Hemanta
B) Shishira, Vasanta, Grishma
C) Varsha, Vasanta, Grishma
D) Varsha, Shishira, Hemanta

76. Ruksha and Sita properties are desirable in
A) Sharad B) Vasanta
C) Hemanta D) Varsha

77. Ruksha and Ushna properties are desirable in
A) Sharad B) Vasanta
C) Hemanta D) Varsha

78. In Grishma Rutu the ideal guna preferred are
A) Snigdha, ushna B) Snigdha, sita
C) Ruksha, sita D) Ruksha, usna

79. Rutu sandhi involves
A) 7 days B) 10 days
C) 14 days D) 15 days

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80. Immediate abandoning and adoption of regimens in Rutusandhi leads to
A) Diseases due to Ojokshaya
B) Diseases due to Ojovyapat
C) Diseases due to Ama
D) Diseases due to Asatmya

81. The Rutu of Adana Kala are
A) Varsha, Sarada, Grishma
B) Shishira, Vasanta, Grishma
C) Hemanta, Shishira, Vasanta
D) Shishira, Vasanta, Varsha

82. The Rutu included in Visarga Kala
A) Varsha, Sharad, Hemanta
B) Vasanta, Grishma, Varsha,
C) Vasanta, Shishira, Hemanta
D) Hemanta, Shishira, Vasanta

83. Bala increases during
A) Adana kala B) Visarga Kala
C) Rutu Sandhi Kala D) Yama Damstra Kala

84. 'Daurbalya Mavahanti' during
A) Visarga Kala B) Adana Kala
C) Visarga and Adanakala
D) None of the above

85. Maximum strength experienced during
A) Starting of Adana Kala
B) Ending of Visarga Kala
C) Both the above
D) Midterm of Visarga and Adana Kala

86. Digestion power is maximum during
A) Vasanta Rutu B) Hemanta Rutu
C) Varsha Rutu D) None of the above

87. Which of the following is contraindicated in Hemanta Rutu
A) Vatakara Ahara
B) Laghu kara Ahara
C) Pravatam, pramitaharam
D) Udamandam E) All the above

88. Katu, Tikta, Kashaya Rasa Ahara should not be advised during
A) Vasanta Rutu B) Shishira Rutu
C) Both the above D) None of the above

89. Maithunam is contraindicated during
A) Vasanta Rutu B) Grishma Rutu
C) Hemanta Rutu D) Shishira Rutu

90. Divaswapna is not contraindicated during
A) Vasanta Rutu B) Hemanta Rutu
C) Grishma Rutu D) Varsha Rutu

91. Maithunam and Vyayamam are not advised during
A) Grishma Rutu B) Varsha Rutu
C) Both the above D) Hemanta Rutu

92. Ksaudra Samskarita Anna Pana should be advised during
A) Shishira Rutu B) Hemanta Rutu
C) Vasanta Rutu D) Varsha Rutu

93. The following is indicated during Sharada Rutu
A) Tiktaka Ghrita Pana
B) Virechana
C) Rakta Mokshana
D) All the above

94. Special Udaka is to be used in Sharad Rutu
A) Hamsodaka B) Kupa udaka
C) Nadijala D) None of the above

95. Type of Gritha advised during Shishira Rutu
A) Nivata Gritha B) Ushna Gritha
C) Both the above D) Shitala Gritha

96. Pitta Prakopa occurs during
A) Hemnta Rutu B) Sharad Rutu
C) Shishira Rutu D) None of the above

97. Vata Prakopa occurs during
A) Hemanta Rutu B) Vasanta Rutu
C) Grishma Rutu
D) Hemanta and Varsha Rutu

98. Udamandham is contraindicated in
A) Hemanta Rutu B) Vasanta Rutu
C) Grishma Rutu
D) Hrmanta and Varsha Rutu

99. Varjaniyam during Sharad Rutu
A) Divasvapna B) Kshara
C) Dadhi D) All the above.

100. The Satmya due to Abhyasa is known as
A) Ritu Satmya B) Oka Satmya
C) Kala Satmya D) Desha Satmya

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Answers on MCQ on Rutucharya

1. C	15. A	29. A	43. A	57. A	71. D	85. C
2. A	16. A	30. A	44. A	58. A	72. A	86. B
3. A	17. A	31. A	45. A	59. A	73. B	87. E
4. C	18. A	32. A	46. B	60. C	74. A	88. B
5. A	19. B	33. A	47. A	61. B	75. A	89. B
6. B	20. C	34. A	48. B	62. A	76. A	90. C
7. A	21. D	35. A	49. D	63. B	77. B	91. C
8. C	22. D	36. A	50. A	64. A	78. B	92. D
9. A	23. B	37. B	51. A	65. A	79. C	93. D
10. A	24. B	38. C	52. B	66. A	80. D	94. A
11. D	25. C	39. A	53. A	67. A	81. B	95. C
12. C	26. A	40. A	54. B	68. A	82. A	96. B
13. A	27. B	41. B	55. A	69. C	83. B	97. A
14. A	28. C	42. C	56. A	70. D	84. B	98. D
						99. D
						100. B

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Chapter 5

Roganutpadaniya

Syllabus

Concept of Vegadharana and Vega-Udirana in relation to health and morbidity. Symptoms and management principles of Adharaniya Vega Janya Vyadhis from Bruhattrayee. Concept of vegaudirana (viz. Use of snuffing powder, forcible evacuation of bowels & bladder etc.).Importance of Dharaniya Vegas in promotion of mental health.

Learning objectives

1. Explain vegadharana and vega-udirana in relation to health and morbidity.
2. Compare the symptoms and management principles of adharaniya vega janya vyadhis from bruhattrayee.
3. Explain with examples the concept of vega-udirana (viz. Use of snuffing powder, forcible evacuation of bowels & bladder etc.).
4. Explain the importance of dharaniya vegas in promotion of mental health.

Total - 3 hours (Lecture :02 hour, Non-lecture: 01 hours)
MCQ- Yes- SAQ (5 Marks)- Yes- LAQ (10 Marks)- No

Human body is an amazing machine which has a number of ways to balance the substance which could be useful and harmful to the body. To make balance of these substances, our body is equipped with Vega (urges) which appears naturally.

Acharya Vagbhata suggested non suppression of natural urges as one of the measures of prevention in Roganutpadaniya Adhyaya. Hemadri elaborating on it mention that without giving importance for time at any time these can be evacuated.

इहानियतकालः । सद्यपङ्क्षधावेगधारणंवेगोदीरणंशोधनंवृहणं, भूतास्पर्शनंचेति । (आयुर्वेदरसायन टिका अ.ह.सू. 4/1)

Five preventive measures like suppression of natural urges, forceful action of unmanifested urges, purification, nourishing and touch by Bhutadi factors should be done irrespective of time.

रोगाः सर्वेऽपिजायन्तेवेगोदीरणधारणैः ॥

Always the diseases are produced due to the Vegadirana and Vegadharana.

Vegadirana-initiation of urges by force

Vegadharana-suppression of urges by force

Roga-disease

Anutpadaniya-prevention of origin

Adharaniya Vega-urges not to be suppressed by force

According to the Ayurvedic texts, there is one main cause of all type of diseases and that is the suppression of natural Vega. Therefore it should not to be suppressed. Ayurveda has described 13 natural Vegas which should not be retained at any cost. If they are suppressed on a regular basis due to any reason, they can lead to various health problems. The problem created due to Non-suppressible urges are getting more and more now a day.

There are two types of natural urges namely Dharaniya Vegas (suppressible urges) and Adharaniya Vegas (non suppressible urges). According to Acharya Charaka, there are 13 types

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of natural urges in the body which should not be suppressed. In addition to these Vegas, 14th Vega is mentioned by Vagbhata. There is a description of thirteen Adharaniya Vegas and the disorders caused by suppressing them with their line of treatment.

न वेगान् धारयेद्धीमाञ्जातान् मूत्रपुरीषयोः।
न रेतसो न वातस्य न छर्द्याः क्षववोर्न च ॥
नोद्गारस्य न जृम्भाया न वेगान् क्षुत्पिपासयोः।
न बाष्पस्य न निद्राया निःश्वासस्य श्रमेण च ॥

(च.सू. 7/3-4)

वेगान्न धारयेद्वातविण्मूत्रक्षवतृट्क्षुधाम निद्राकासश्रमश्वास-जृम्भाश्रुच्छर्दितसाम ॥ (अ.ह.सू. 4/1)

1. Mutra Vega
2. Purisha Vega
3. Shukra Vega
4. Apana Vayu Vega
5. Chardi Vega
6. Kshavathu Vega
7. Udaggara Vega
8. Jrumbha Vega
9. Kshudha Vega
10. Trushna Vega
11. Bashpa Vega
12. Nidra Vega
13. Shramashwasa Vega
14. Kasavega (A/C Vagbhata)

1. Mutravarodhaja Roga and Chikitsa

Charaka Samhita	Ashtanga Hrudaya
बस्तिमेहनयोः शूलं मूत्रकृच्छ्रं शिरोरुजा । विनामो वंक्षणानाहः स्याल्लिङ्गं मूत्रनिग्रहे ॥ The symptoms of Mutra Vega Dharana are Basti Mehanayo Shulam (pain in bladder and penis), Mutrakruchra (dysuria), Shiro Ruja (headache), Vinamo (forward bending of the body) and Vankshana Anaha (distension of lower abdomen. स्वेदावगाहनाभ्यङ्गान् सर्पिषश्चावपीडकम् । मूत्रे प्रतिहते कुर्यात्त्रिविधं बस्तिकर्म च ॥ Sveda (fomentation), Avagahana (tub bath), Abhyanga (oil massage), Sarpisha Avapidaka (administration of ghee in excess), Trividha Basti Karma (Niruha, Anuvasana and Uttara Basti).	अङ्गभङ्गाश्मरीबस्तिमेढ्रवङ्क्षणवेदनाः ॥ मूत्रस्य रोधात्पूर्वे च प्रायो.... The suppression of the urge of urine may lead to a Angabhanga (cutting pain all over the body). It may also cause formation of Ashmari (urinary stones), Basti Medhra Vakshana Vedana (severe pain in the urinary bladder, penis and groin) and suppression of flatus and faeces. .....रोगास्तदौषधम् । वर्त्यभ्यङ्गावगाहाश्च स्वेदनं बस्तिकर्म च ॥ अन्नपानं च विड्भेदि विड्रोधोत्थेषु यक्ष्मसु । of Vata (flatus), Purisha (faeces) and Mutra (urine), the following should be given. Varti (Rectal and urethral suppositories), Abhyanga (Oil massage), Avagaha (tub bath, sitz bath), Swedana (sudation therapy), Bastikarma (enema) and Annapaanam Cha Vidbhedhi (all food that help to induce purgation) should be administered.

2. Purisha Vega Avarodha Janya Roga and Chikitsa

Charaka Samhita	Ashtanga Hrudaya
पक्वाशयशिरःशूलं वातवर्चोऽप्रवर्तनम् । पिण्डिकोद्वेष्टनाध्मानं पुरीषे स्याद्विधारिते ॥ The symptoms of Purisha Vega Dharana are Pakvashaya Shula (abdominal colic pain), Shira Shula (headache), Vata, Varcha Aprav-	शकृतः पिण्डिकोद्वेष्टप्रतिश्यायशिरोरुजः । ऊर्ध्ववायुः परीकर्तो हृदयस्योपरोधनम् ॥ मुखेन विट्प्रवृत्तिश्च पूर्वोक्ताश्चामयाः स्मृताः । Suppression of urge of faeces gives Pindikodveshtana (rise to pain in the calves).

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artana (retention of faeces and flatus), Pindikodveshtana (cramps in the calf muscles) and Adhmana (distension of abdomen). स्वेदाभ्यङ्गावगाहाश्च वर्तयो बस्तिकर्म च । हितं प्रतिहते वर्चस्यन्नपानं प्रमाथि च ॥ In such cases, Sveda (fomentation), Abhyanga (oil massage), Avagahana (tub bath), Varti (rectal suppositories), Basti Karma (enema) and Pramathi Annapana (intake of foods and drinks that are laxative in nature).	Pratishyaya (running of the nose), Urdhwavayu (upward movement of Vata), Parikarta (cutting pain in the rectum), Hrudyasyoparodha (oppression in the region of heart), Mukhena Vitpravrutti (faeces coming from the mouth) etc. are the signs and symptoms caused due to the suppression of the urge of faeces along with the diseases mentioned earlier in respect of the suppression of flatus. **Treatment same as explain in Mutra Vega Dharana**

3. Apana Vega Avarodha Janya Roga and Chikitsa

Charaka Samhita	Ashtanga Hrudaya
सङ्गो विण्मूत्रवातानामाध्मानं वेदना क्लमः । जठरे वातजाश्चान्ये रोगाः स्युर्वातनिग्रहात् ॥ Suppressing the urge of passing flatus causes Sango Vit Mutra Vatanam (retention of faeces, urine and flatus), Adhmana (distension of abdomen), Vedana (pain), Klama (exhaustion) and Vatajanya Roga (Diseases of Vata imbalance) in stomach. स्नेहस्वेदविधिस्तत्र वर्तयो भोजनानि च । पानानि वस्तयश्चैव शस्तं वातानुलोमनम् ॥ Snehana (oleation), Sveda (fomentation), Varti (rectal suppositories), Vatanulomana Bhojana, Panani (intake of foods and drinks that enables normal downward movement of flatus) and Basti (rectal enema).	अधोवातस्य रोधेन गुल्मोदावर्तरुक्क्लमाः । वातमूत्रशकृत्सङ्गदृष्ट्यग्निवधहृद्गदाः ॥ By suppression of the urge of flatus, one is subjected to such diseases as the Gulma (abdominal tumour), Udavarta (upward movement inside the alimentary tract), Ruk (pain in the stomach), Klama (exhaustion even without exertion), Vata Mutra Shakruta Sanga (blockage to the elimination of flatus, urine and faeces), Adrushtya (loss of vision). Agni Vadha (loss of digestive capacity) and Hrudgada (diseases of the heart) may also occur as result of the suppression of the flatus. **Treatment same as explain in Mutra Vega Dharana**

4. Retas Vega Avarodha Janya Roga and Chikitsa

Charaka Samhita	Ashtanga Hrudaya
मेढ्रे वृषणयोः शूलमङ्गमर्दो हृदि व्यथा । स्यवेत् प्रतिहते शुक्रे विबद्धं मूत्रमेव च ॥ Suppressing urge of ejaculation leads to Medhra Vrushana Shula (Pain in penis and testicles), Angamarda (malaise- body ache), Hrudi Vyatha (pain and discomfort in chest region) and Mutra Vibandha (retention of urine). तत्राभ्यङ्गोऽवगाहश्च मदिरा चरणायुधाः । शालिः पयो निरूहश्च शस्तं मैथुनमेव च ॥ Abhyanga (oil massage to groin region), Avagaha (tub bath), Madira (wine), Charanayudha (chicken), Shali (rice), Paya (milk), Niruha Basti (made with Kashayam) and Maithuna (sexual intercourse).	शुक्रात्तस्त्रवणं गुह्यवेदनाश्ववथुज्वराः॥ हृद्व्यथामूत्रसङ्गाङ्गभङ्गवृद्ध्यश्मषण्डताः । Guhya Vedana (pain in groin), Shvayathu (oedema), Jvara (fever), Hrid Vyatha (cardiac pain, distress), Mutrasanga (obstruction to the flow of urine and difficulty), Angabhanga (body ache), Vruddhi (Hernia), Ashma (stone formation) and Shandata (impotency) occur due to the suppression of semen. ताम्रचूडसुराशालिबस्त्यभ्यङ्गावगाहनम् ॥ बस्तिशुद्धिकरैः सिद्धं भजेत्क्षीरं प्रियाः स्त्रियः । Tamrachuda (chicken), Sura (alcohol), Shali (rice), Basti Abhyanga (massage to the lower abdomen), Avagaha (immersion bath with oil),

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	Bastishuddhi (cleansing of urinary bladder with enema) Kshira (treatment with milk processed with herbs) and Priya Striyaha (copulation).

5. Chardi Vega Avarodha Janya Roga and Chikitsa

Charaka Samhita	Ashtanga Hrudaya
कण्डूकोठारुचिष्व्यङ्गशोथपाण्ड्वामयज्वराः । कुष्ठहृल्लासवीसर्पाश्छर्दिनिग्रहजा गदाः The symptoms of Chardi Vega Dharana are Kandu (itching), Kota (urticaria), Aruchi (anorexia), Shotha (oedema), Pandvamaya (anaemia), Jwara (fever), Kushta (skin diseases), Hrullasa (nausea) and Visarpa (spreading type of skin disease). भुक्त्वा प्रच्छर्दनं धूमो लङ्घनं रक्तमोक्षणम् । रूक्षान्नपानं व्यायामो विरेकश्चात्र शस्यते ॥ Buktva Prachardanam (induction of vomiting after food intake), Dhumapana (smoking), Langhana (fasting) , Raktamokshana (bloodletting), Ruksha Annapana (food and drink which are Ruksha (dry in nature), Vyayama (physical exercise) and Virechana (purgation treatment).	विसर्पकोठकुष्ठाक्षिकण्डूपाण्ड्वामयज्वराः । सकासश्वासहृल्लासव्यङ्गश्वयथवो यमेः ॥ Visarpa (Herpes, spreading skin disease), Kotha (allergic skin rashes), Kushta (skin diseases), Akshi Roga (eye disorders), Kandu (itching sensation), Pandu (Anemia), Jvara (fever), Kasa (cough), Shwasa (Asthma, breathing difficulty), Hrullasa (nausea, vomiting sensation), Vyanga (pigmented patches on face) and Shvayathu (oedema), occur due to the suppression of vomiting. गण्डूषधूमानाहारा रूक्षं भुक्त्वा तदुद्गमः । व्यायामः स्रुतिरस्रस्य शस्तं चात्र विरेचनम् ॥ सक्षारलवणं तैलमभ्यङ्गार्थं च शस्यते । Gandusha (gargling), Dhumapana (herbal smoke inhalation), Ruksha Ahara (dry eatables), Vamana (inducing vomiting), Vyayama (exercise), Ashra Sruti (bloodletting) and Virechana (purgation) are the treatments.

6. Kshavathu Vega Avarodha Janya Roga and Chikitsa

Charaka Samhita	Ashtanga Hrudaya
मन्यास्तम्भः शिरःशूलमर्दितार्धावभेदकौ । इन्द्रियाणां च दौर्बल्यं क्षवथोः स्याद्विधारणात् ॥ The symptoms of Kshavathu Vega Dharana are Manyasthamba (neck stiffness), Shirashula (headache), Ardita (facial paralysis), Ardhavabhedaka (migraine) and Indriyanam Daurbalyam (weakness of the sense organs). तत्रोर्ध्वजत्रुकेऽभ्यङ्गः स्वेदो धूमः सनावनः । हितं वातघ्नमाद्यं च घृतं चौत्तरभक्तिकम् ॥ Urdhwa Jatru Abhyanga (oil massage to head and neck), Svedana (fomentation), Dhumapana (smoking), Navana (nasal drops) and Vatahara Bhojana (food that pacifies Vata) and Uttarabhaktika Ghrita (intake of ghee after meals).	शिरोऽर्तीन्द्रियदौर्बल्यमन्यास्तम्भार्दितं क्षुतेः । Suppression of sneezing may cause Shiro Arti (headache), Indriya Daurbalya (weakness of sense organs), Manyasthamba (Neck stiffness) and Ardita (Facial palsy). तीक्ष्णधूमाञ्जनाघ्राणनावनार्कविलोकनैः ॥ प्रवर्तयेत्क्षुतिं सक्तां स्नेहस्वेदौ च शीलयेत् । Tikshna Dhumapana (inhalation of fumes), Tikshna Anjana (Collyrium), Tikshna Dravya Navana (Snuffing), Tishna Arkavilokana (gazing sun directly for a few seconds) and Sneha (oleation), Swedana (sudation therapies) are also mentioned as treatment. Vatahara Ahara Sevana (consuming the foods which mitigate Vata.

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7.Udgara Vega Avarodha Janya Roga and Chikitsa

Charaka Samhita	Ashtanga Hrudaya
हिक्का श्वासोऽरुचिः कम्पो विबन्धो हृदयोरसोः । उद्गारनिग्रहात्तत्र हिक्कायास्तुल्यमौषधम् ॥ The symptoms of Udgara Vega Dharana are Hikka (hiccups), Shwasa (breathing difficulties), Aruchi (anorexia) Kampa (tremors), Vibandho Hrudaya Uraso (feeling of obstruction in chest and heart region). **Treatment-** Similar to the treatment for suppression of hiccups.	.....धारणात्पुनः ॥ उद्गारस्यारुचिः कम्पो विबन्धो हृदयोरसोः । आध्मानकासहिध्माश्च हिध्मावत्तत्र भेषजम् ॥ Suppression of belching may cause Aruchi (Anorexia), Kampa (tremors), Vibandha (constipation), Hrudayo Raso (stiffening sensation in chest region), Adhmana (bloating, gaseous distension of abdomen), Kasa (cough) and Hidhma (hiccup). **Treatment-** The treatment for this is similar to treatment of hiccups.

8. Jrumbha Vega Avarodha Janya Roga and Chikitsa

Charaka Samhita	Ashtanga Hrudaya
विनामाक्षेपसंकोचाः सुप्तिः कम्पः प्रवेपनम् । जृम्भाया निग्रहात्तत्र सर्वं वातघ्नमौषधम् ॥ The symptoms of Jrumbha Vega Dharana are Vinama (forward bending of the body), Akshepa (convulsion), Samkocha (contractions), Supti (numbness), Kampa (tremor) and Pravepana (shaking of the body). **Treatment-** measure should be followed to balance the Vata Dosha.	जृम्भायाः क्षववद्रोगाः सर्वश्चानिलजिद्विधिः ॥ The suppression of yawning produces similar symptoms to that of suppression of sneezing. **Treatment-** Vata balancing activities/ treatment should be given.

9.Kshudha Vega Avarodha Janya Roga and Chikitsa

Charaka Samhita	Ashtanga Hrudaya
कार्श्यदौर्बल्यवैवर्ण्यमङ्गमर्दोऽरुचिर्भ्रमः । क्षुद्वेगनिग्रहात्तत्र स्निग्धोष्णं लघु भोजनम् ॥ The symptoms of Kshudha Vega Dharana are Karshya (emaciation), Dourbalya (weakness), Vaivarnya (change in skin complexion), Angamarda (Malaise or body ache), Aruchi (anorexia) and Bhrama (dizziness). **Treatment-** Intake of Snigdha (unctuous), Ushna (hot) and Laghu (light) to digest food.	अङ्गभङ्गारुचिग्लानिकार्श्यशूलभ्रमाः क्षुधः ॥ तत्र योज्यं लघु स्निग्धमुष्णमल्पं च भोजनम् । Angabhanga (body ache), Aruchi (Anorexia, lack of interest in taking food), Glani (debility), Karshya (emaciation), Shula (abdominal colic pain), Bhrama (delusion) occur due to the suppression of hunger. **Treatment-** Laghu Bhojana (light meals), with Snigdha (oily) substance (such as ghee), which is Alpa (little quantity) and Ushna (hot/warm) in nature.

10. Pipasa Vegavarodhaja Roga and Chikitsa

Charaka Samhita	Ashtanga Hrudaya
कण्ठास्यशोषो बाधिर्यं श्रमः सादो हृदि व्यथा । पिपासानिग्रहात्तत्र शीतं तर्पणमिष्यते ॥ The symptoms of Pipasa Vega Dharana are Kanta Asya Shosha (dryness of throat and mouth), Badhirya (deafness), Shrama (tiredness),	शोषाङ्गसादबाधिर्यसम्मोहभ्रमहृद्गदाः ॥ तृष्णाया निग्रहात्तत्र शीतः सर्वो विधिर्हितः । Suppression of thirst leads to Shosha (emaciation), Angasada (debility), Badhirya (deafness), Sammoha (delusion), Bhrama

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Sada (Angasada- inactiveness), and Hrudi Vyatha (pain in heart region). **Treatment-** Coolant drinks that bring the satisfaction.	(giddiness) and Hrugada (cardiac pain). **Treatment-** Use cold water for drinking and bathing. Manage the condition by the intake of cold substances like foods and drinks.

11.Bashpa Vega Avarodha Janya Roga and Chikitsa

Charaka Samhita	Ashtanga Hrudaya
प्रतिश्यायोऽक्षिरोगश्च हृद्रोगश्चारुचिर्भ्रमः । बाष्पनिग्रहणात्तत्र स्वप्नो मद्यं प्रियाः कथाः ॥ The symptoms of Bashpa Vega Dharana are Pratishyaya (rhinitis), Akshi Roga (eye diseases), Hrudroga (heart diseases), Aruchi (anorexia), Bhrama(giddiness). **Treatment** -Swapna (sleep), Madyapana (intake of wine) and Priyakatha (pleasing talks/stories).	पीनसाक्षिशिरोहृद्ग्रङ्मन्यास्तम्भारुचिभ्रमाः । सगुल्मा बाष्पतस्तत्र स्वप्नो मद्यं प्रियाः कथाः ॥16॥ Pinasa (running nose, rhinitis), Akshi Roga (eye disorders), Hridrika (heart diseases associated with pain), Manyasthamba (neck stiffness), Aruchi (Anorexia, lack of interest in taking food), Bhrama (delusion) and Gulma (Abdominal tumour) occur due to the suppression of tears. **Treatment-** Swapna (sleep), Madya (alcohol) and Priya Katha (hearing of pleasant stories).

12. Nidra Vega Avarodha Janya Roga and Chikitsa

Charaka Samhita	Ashtanga Hrudaya
जृम्भाऽङ्गमर्दस्तन्द्रा च शिरोरोगोऽक्षिगौरवम् । निद्राविधारणात्तत्र स्वप्नः संवाहनानि च ॥ The symptoms of Nidra Vega Dharana are Jrumbha (yawning), Angamarda (body ache), Tandra (drowsiness), Shiroroga (headache), Akshi Gourava (heaviness in the eyes). **Treatment-** Svapna - Advised to sleep and Samvahana (gentle massage of the body-kneading).	निद्राया मोहमूर्धाक्षिगौरवालस्यजृम्भिकाः ॥ अङ्गमर्दश्च, तत्रेष्टः स्वप्नः संवाहनानि च । Moha (delusion), Murdha Akshi Gourava (heaviness of head and eyes), Alasya (laziness), Jrumbhika (yawning), Angabhanga (body ache) occur due to the suppression of sleep. **Treatment-** Swapna (sound sleep) and Samvahana (mild massaging) are the ideal treatment for the above symptoms.

13. Shrama Janya Nisvasa Vega Avarodha Janya Roga and Chikitsa

Charaka Samhita	Ashtanga Hrudaya
गुल्महृद्रोगसंमोहाः श्रमनिःश्वासधारणात् । जायन्ते तत्र विश्रामो वातघ्न्यश्च क्रिया हिताः ॥ The symptoms of Shrama Janya Nisvasa Vega Dharana are Gulma (phantom tumour), Hrudaroga (heart diseases) and Sammoha (confusion). **Treatment-** Visrama (rest) and Vataghna Kriya (following of regimen prescribed for Vata Dosha balance).	गुल्महृद्रोगसम्मोहाः श्रमश्वासाद्विधारितात् ॥ हितं विश्रमणं तत्र वातघ्नश्च क्रियाक्रमः । Gulma (Abdominal tumour), Hrudroga (cardiac disorder) and Sammoha (loss of consciousness, delusion) occur due to the suppression of breathing on exertion. **Treatment-** Vishrama (taking rest, not doing any physical activity) and Vataghna Kriyakrama (involving therapies which mitigate Vata are ideal treatments for these.

14.Kasa Vega Avarodha Janya Roga and Chikitsa according to Ashtanga Hrudaya

कासस्य रोधात्तद्वृद्धिः श्वासारुचिहृदामयाः ॥ शोषो हिध्मा च, कार्योऽत्र कासहा सुतरां विधिः ।

Symptoms- Shwasa (Asthma, breathing difficulty), Aruchi (Anorexia, lack of interest in taking food), Hrudamaya (cardiac disorder), Shosha (Emaciation), Hidhma (hiccup), occur due to the suppression of cough.

Treatment - The treatments which relieve cough should be given.

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Dharaniya Vega-suppressible urges

धारयेत्तु सदा वेगान हितैषी प्रेत्य चेह च।
लोभईर्ष्याद्वेषमात्सर्यरागादीनां जितेन्द्रिय॥
(अ.हृ.सू. 4/24)

इमांस्तु धारयेदवेगान हितार्थी प्रेत्य चेह च।
साहसानानशस्तानां मनोवाककायकर्मणाम॥
(च.सू. 7/26)

The one who is desirous of his Hita (well-being) during his lifetime and after death, should suppress urges relating to Mana (mentally), Vak (orally) and Kaya (physically) like Sahasa (work beyond one's own capacity) and Ashasta (improper activities).

Ashastama Manasa Karma-improper activities related to mind

लोभशोकभयक्रोधमानवेगान विधारयेत।
नैर्लज्ज्येर्ष्यातिरागाणामभिध्यायाश्च बुद्धिमान॥
(च.सू. 7/27)

Lobha (greed), Shoka (grief), Bhaya (fear), Krodha (anger), Mana (vanity), Nirlajja (shameless), Irshya (jealousy), Atiraga (over attachment), Abhidya (desire for others property), one should suppress above said urges.

Ashastama Vacana Karma- improper activities related to speech

पुरुषस्यातिप्रस्य सूचकस्यानृतस्य च।
वाक्यस्याकालयुक्तस्य धारयेदवेगमुत्थितम॥
(च.सू. 7/28)

Parusha (hard words), Atimatra (talkative), Suchaka (back biting), Anrita (lying), Akalayukta (use of untimely words) one should suppress above said urges.

Ashastama Deha Karma- improper body activities which are injurious to others

देहप्रवृत्तिर्या काचिद्विद्यते परपीडया।
स्त्रीभोगस्तेहिंसाद्या तस्यावेगान्विधारयेत॥
(च.सू. 7/29)

Streebhoga (adultery), Steya (theft), Himsa (hurting) one should suppress above said urges.

Benefits of Dharaniya Vegas

पुण्यशब्दो विपापत्वान्मनोवाककायकर्मणाम।
धर्मार्थकामान पुरुषः सुखी भुक्ते चिनोति च॥
(च.सू. 7/30)

Being free from sins of Mana (mind), Vaka (speech) and Kaya (body), a happy man enjoys and acquires Dharma, Artha and Kama.

Importance of Shodhana Chikitsa (Purificatory Therapies)

यतेत च यथाकालं मलानां शोधनं प्रति।
अत्यर्थसञ्चितास्ते हि ऋद्धाः स्युर्जीवितच्छिदः॥
(अ.हृ.सू. 4/25)

All our efforts should be made to clear out the Malas (Doshas and waste products) at appropriate times, accumulation leads to their aggravation and even death.

दोषाः कदाचित्कुप्यन्ति जिता लङ्घनपाचनैः।
ये तु संशोधनैः शुद्धा न तेषां पुनरुद्भवः॥
(अ.हृ.सू. 4/26, अ.स.सू. 5/24)

The Doshas which are mitigated by Langhana and Pachana therapies might sometimes become aggravated again but those which are cleared by Samshodhana Therapies will not get aggravated again.

यथाक्रमं यथायोगमत ऊर्ध्वं प्रयोजयेत।
रसायनानि सिद्धानि वृष्ययोगांश्च कालवित॥
(अ.हृ.सू. 4/27, अ.स.सू. 5/25)

The physician who knows the proper time of every therapy should administer them in proper procedure and proper degree; later on administer appropriate effective Rasayana (rejuvenators) and Vajikarana (aphrodisiacs) Yogas.

Elimination of Doshas According to Rutu (Seasons)

शीतोत्थदवं दोषचयं वसन्ते विशोधनं ग्रीष्मजमभ्रकाले।
घनात्यये वार्षिकमाशु सम्यक प्राप्नोति रोगानृतुजान्न जातु॥
(अ.हृ.सू. 4/35, अ.स.सू. 5/29)

Accumulation of Doshas arising from cold season should be expelled during Vasanta or spring, arising Doshas in Grishma /summer should be expelled during Abhrakala or Varsha or rainy season, arising Doshas in Varsha be expelled during Ghanatyaya or Sarad or autumn. By this People will not become victims of diseases born by the effect of seasons.

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Effects of Vega Dharana

All the diseases are manifested by either of the below mentioned -

Vega Udeerana - initiating the urges forcibly when they are not impending or when the body is not producing these reflexes

Vega Dharana - forcibly withholding the urges which are initiated by the body

All these Vegas, when forcibly suppressed lead to vitiation of Vata. This vitiated Vayu moves haphazardly in undesired directions, mainly upward direction. This condition is called Udavarta. Though individual treatments (specific to particular Vega dharana) have been discussed in earlier passages, the main criteria will be to control Vata, regularize its normal movements and bring about its balance. Thus, controlling Vayu' is the key remedy for Udavarta caused by Vega Dharana.

This means to tell that, the Vega Dharana or Udecrana is responsible for causation of all the diseases. If not controlled in time, the vitiated Vayu which has taken abnormal routes will tend to disturb the other doshas and damage the tissues and organs of the body. This leads to wide array of psycho-somatic disorders, which might become stubborn with passage of time. With chronicity, the body will be trained to consider 'holding urges' and 'Udavarta' as normal phenomenon. The small issues would have shaped into disasters and the diseases will be technically under 'impossible to cure' category.

MCQ on Roganutpadaniya

1. Adharniya vega are _____ in number.
   A] 8 B] 9
   C] 10 D] 13
2. Good sleep and mild massage are the ideal treatment for _____.
   A] मूत्ररोध B] निद्रारोध
   C] तृष्णारोध D] कासरोध
3. स्वप्नो मद्यं प्रियाः कथाः । are the treatments for _____.
   A] निद्रारोध B] अश्रुरोध
   C] कासरोध D] क्षवथुरोध
4. रोगाः सर्वेऽपि जायन्ते.....।
   A] मन्दाग्निः B] दोषाः
   C] वेगोदीरणधारणैः D] आमः
5. Dharaniya Vega are _____ in number.
   A] 2 B] 3
   C] 4 D] 6
6. The urges which should be suppressed are called _____ vega
   A] Dharaniya B] Adharaniya
   C] Shakagata D] Kosthagata
7. The urges which should not be suppressed are called _____ vega
   A] Dharaniya B] Adharaniya
   C] Shakagata D] Kosthagata
8. By Langhana and Pachana therapies mitigated Dosha might get aggravated but by _____therapies, dosha will not get aggravated again.
   A] Shodhana B] Shamana
   C] Santarpana D] Apatarpana
9. तथा स लभते सर्वपावकपाटवम् । according to this पावक means _____
   A] मल B] अग्नि
   C] दोष D] धातु
10. The accumulation of Dosha arising from cold season should be expelled out during _____season.
    A] Sharad B] Grishma
    C] Vasanta D] Hemanta
11. The accumulation of Dosha arising from Grishma rutu should be expelled out during _____season.
    A] Varsha B] Vasanta
    C] Sharada D] Hemanta
12. The accumulation of Dosha arising from Varsha should be expelled out during _____ seasons.
    A] Vasanta B] Grishma
    C] Sarada D] Hemanta
13. Kasa is included in _____ Vega by Vagbhata
    A] Adharaniya B] Dharaniya
    C] Purisha D] Mutra

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14. Iccha is included in _____ vega
A] Adharaniya B] Dharaniya
C] Purisha D] Mutra

15. _____ is included in Adharaniya Vega
A] Mutra B] Lobha
C] Irsha D] Dvesha

16. _____is included in Adharaniya Vega
A] Matsara B] Nidra
C] Lobha D] Irsha

17. _____is included in Adharaniya Vega
A] Dvesha B] Lobha
C] Irsha D] Jrumbha

18. _____ is included in Adharaniya Vega
A] Lobha B] Irsha
C] Ashru D] Dvesha

19. _____ is included in Adharaniya Vega
A] Lobha B] Shrama Shwasa
C] Irsha D] Dvesha

20. 'Avapidaka Ghrita' should be administered in suppression of _____ vega
A] Purisha B] Mutra
C] Kshavathu D] Kshut

21. Identify the odd word from the group- "Purisha, Mutra, Kshudha, Lobha''
A] Purisha B] Mutra
C] Kshudha D] Lobha

22. Dosa plays key role in Vega Udirana and Vega Dharana
A) Vata B) Vatapitta
C) Vatakapha D) Tridosha

23. Chemoreceptor trigger is zone linked with
A) Vomiting B) Tears
C) Cough D) Sleep

24. Dristivadh and agnivadh are the features of suppression
A) Adho vata B) Nidra
C) Retas D) Jrimbha

25. Pindikodvesta and pratisyaya are the features of suppression of
A) Adho vata B) Retas
C) Sakrit D) Mutra

26. Gulma is linked with the suppression of
A) Adho vata, Srama svasa
B) Sakrit, mutra
C) Kshut, trisna D) Baspa, jrimbha

27. Uttama matra of Ghrita is administered to pacify the diseases due suppression of
A) Mutra vega B) Nidra vega
C) Ashru vega D) Retas

28. Angabhanga is associated with suppression of
A) Mutra, kshut, sukla
B) Nidra, ksava, baspa
C) Jrimbha, udgara, kasa
D) Sakrt, adho vata, jrmbha

29. The treatment protocol to pacify diseases owing to suppression of Mutra vega does NOT include
A) Varti B) Avagaha
C) Abhyanga D) Udvartana

30. Aruchi and Kampa are caused by suppression of
A) Nidra B) Sakrit
C) Udgara D) Kasa

31. The suppression of —— vega leads to another vega namely—
A) Udgara, kasa B) Nidra, ashru
C) Sakrit, mutra D) Ksut, trisna

32. The treatment of Udgara vega rodha is the same as that of
A) Hikka B) Kasa
C) Svasa D) Chardi

33. Headache is associated with supression of
A) Sakrit, ksava B) Kasa, svasa
C) Nidra, retas D) Sakrit, kasa

34. Weakness of sense organs is associated with suppression of
A) Kshava B) Nidra
C) Svasa D) Kshut

35. Manyasthambha and Ardita are associated with suppression of
A) Chardi B) Adho vata
C) Ksava D) Nidra

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36. Arkavilokana (watching the sun) is the treatment for suppression of
A) Ksava B) Nidra
C) Sakrit D) Mutra

37. Svedana is specially indicated in suppression of
A) Mutra, ksava B) Kshut, Trushna
C) Baspa, chardi D) Adho vata, Trushna

38. The treatment for suppression of Ksava vega does NOT include
A) Nasya B) Dhoomapana
C) Anjana D) Vamana

39. Badhirya and Sammoha are due to suppression of
A) Trushna B) Kshut
C) Nidra D) Jrimbha

40. The sense organ affected by suppression of Trushna vega
A) Ears B) Eyes
C) Skin D) Tongue

41. Karshya and sula are caused by suppression of
A) Trushna B) Kshut
C) Ashru D) Nidra

42. The ideal food to be consumed to combat the complaints associated with Kshut vega
A) Laghu, snigdha, usna, alpa bhojanam
B) Guru, snigdha, sita, bahu bhojanam
C) Laghu, snigdha, sita, bahu bhojanam
D) Guru, snigdha, usna, alpa bhojanam

43. Alasyam and Angamardam are the features of suppression of
A) Kshut B) Trushna
C) Nidra D) Jrmbha

44. Aruchi is the common feature of suppression of
A) Udgara, kshut, kasa
B) Baspa, Trushna, svasa
C) Sakrt, nidra, retas
D) Ksava, adho vata, mutra

45. Hidma is common feature of suppression of
A) Udgara, kasa B) Kshut, ksava
C) Trushna, nidra D) Baspa, chardi

46. Shosha is the common feature of suppression of
A) Trushna, kasa B) Kshut, ksava
C) Nidra, baspa D) Chardi, retas

47. Kasa is the common feature of suppression of
A) Kasa, udgara, chardi
B) Kshut, ksavatu, Sramasvasa
C) Nidra, baspa, adho vata
D) Sakrt, mutra, Trushna

48. Svayathu is the common feature of suppression of
A) Sukla, chardi B) Mutra, adho vata
C) Kshut, Trushna D) Baspa, nidra

49. Asmari is the feature of suppression of
A) Mutra, sukra B) Adho vata, mutra
C) Sramasvasa, sakrt D) Trushna, jrmbha

50. Jvara is the common feature of suppression of
A) Chardi, sukra B) Adho vata, mutra
C) Nidra, kasa D) Sramasvasa, udgara

51. Akshiroga is the common feature of suppression of
A) Bashpa, chardi B) Sukla, jrmbha
C) Udgara, ksava D) Nidra, Sramasvasa

52. Pinasa is the feature of suppression of
A) Nidra B) Bashpa
C) Chardi D) Sramasvasa

53. Manyasthambha is the common feature of suppression of
A) Bashpa, ksavathu B) Chardi, Sramasvasa
C) Kshut, Trushna D) Jrmbha, udgara

54. ——— is NOT included in the management of Chardi vegarodha
A) Gandoosha B) Raktamoksham
C) Virechana D) Nasya

55. Abhyanga with oil mixed with kshara and lavana is advised to counter complaints of
A) Chardivega rodha
B) Mutravegarodha
C) Adho vatavegarodha
D) Sakrtvegarodha

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56. Abhyanga and Avagaha are indicated in management of suppression of....vega
A) Mutra, sukra B) Kasa, Hikka
C) Kshut, Trushna D) Jrmbha, udgara

57. Mutrasanga is the common feature of suppression of
A) Adho vata, sukra B) Sakrt, mutra
C) Chardi, Jrmbha D) Sramasvasa, udgara

58. Cardiac involvement is NOT associated with suppression of the following Vegas
A) Baspa, sukla B) Udgara, Trushna
C) Kasa, adho vata D) Nidra, kshut

59. The treatment for Jrumbha vegarodha is similar to that of
A) Ksavathu B) Ashru
C) Udgara D) Baspa

60. The basic aim of management of Vegarodha is
A) Vata anulomana B) Pita prasamana
C) Kapha prasamana D) Tridosa samana

61. The following are bad prognosis of vegarodha EXCEPT
A) Shoola B) Trushna
C) Kshut D) Kshina

62. The concept of Ritushodana is mentioned under
A) Roganutpadaniya B) Ritucharya
C) Dinacharya D) Ayushkamiyam

63. The ideal diet for those exhausted by therapeutic procedures (Bheshaja kshapita) does NOT include
A) Sali, sastika B) Godhuma, mamsa
C) Mudga, ghrita D) Yava, madhu

64. The ideal management of those exhausted by therapeutic procedures does NOT include
A) Snehavasti B) Udvartana
C) Snana D) Nasya

Answers of MCQ on Roganutpadaniya

1. D	14. A	27. A	40. A	53. A
2. B	15. A	28. A	41. B	54. D
3. B	16. B	29. D	42. A	55. A
4. C	17. D	30. C	43. C	56. A
5. B	18. C	31. A	44. A	57. A
6. A	19. B	32. A	45. A	58. D
7. B	20. B	33. A	46. A	59. A
8. A	21. D	34. A	47. A	60. A
9. B	22. A	35. C	48. A	61. C
10. C	23. A	36. A	49. A	62. A
11. A	24. A	37. A	50. A	63. D
12. C	25. C	38. D	51. A	64. D
13. A	26. A	39. A	52. B	

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Chapter 6

Sadvritta

Syllabus

Sadvritta measures for the maintenance of personal, social and spiritual health. Observance of Sadvritta for the prevention of Adharma. "Achara Rasayana" and its role in the prevention and control of diseases. Characteristics of a mentally healthy person, warning signals of poor mental health, types of mental illness and causes of mental ill-health. Mental health services and comprehensive mental health programme. Role of Trigunas and Satvavajaya inmental health promotion in present era. Digital health promotion

Learning objectives

1. Understand and adopt the Sadavritta measures for the maintenance of personal, social and spiritual health.
2. Explain how the observance of Sadvritta helps for the prevention of Adharma
3. Describe "Achara Rasayana" and its role in the prevention and control of diseases.
4. Explain characteristics of a mentally healthy person, warning signals of poor mental health, types of mental illness and causes of mental ill-health.
5. Describe the mental health services and comprehensive mental health programme.
6. Explain the role of trigunas and satvavajaya in mental health promotion in present era.
7. Describe digital health
8. Explain Promotion of Digital health

Total - 3 hours (Lecture :02 hour, Non-lecture: 01 hours)
MCQ- Yes- SAQ (5 Marks)- Yes- LAQ (10 Marks)- No

Sadvritta the Personality of a Person is Enhanced by Good Conduct

(Refer- Cha.Su.8/17-29, Cha.Chi.1/4/32-34, Su.Chi.24/89-101, A.H.Su.2/21-22, A.S.Su.3/50)

Sad means good and Vritta means regimen. This is code of conduct for keeping good or balanced condition of body and mind. This also can be called as health promoting conduct.

Sadvritta is basically for keeping the mind healthy. A healthy mind is as important as a healthy body. When the body possesses Satvik quality of mind, it directs all actions for the welfare of an individual. Rajas and Tamas qualities are harmful qualities of mind. Unhealthy mind generates wrong judgments and misconceptions by the intellect. It is responsible for producing disease. So every attempt should be made to increase the Satvik quality of mind.

The personality of a person is enhanced by good conduct. This could be a personal conduct or social conduct. A self-review could help to judge one's conduct. Ayurveda has discussed conduct, under the topic "Sadvritta" or ethical regimen.

Ayurveda describes certain rules for maintaining a healthy state of body and mind. This code of conduct can be classified into following five types.

They are the principals of right conduct that are applicable to all people. If an individual will

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practice these principles, he or she will have balance and peace of mind.

1. Ethical Conduct (Vyavaharika Sadvritta)
2. Social Conduct (Samajik Sadvritta)
3. Mental Conduct (Manasik Sadvtitta)
4. Moral Conduct (Dharmika Sadvritta)
5. Physical Conduct (Shariric Sadvritta)

Principles of preventing Psychic Disturbances

तत्रेन्द्रियाणांसमनस्कानामनुपतप्तानामनुपतापाद्याप्रकृतिभावे-प्रयतितव्यमेभिर्हेतुभिः तद्यथा–सात्म्येन्द्रियार्थं संयोगेनबुध्द्या-सम्यग वेक्ष्यावेक्ष्यकर्मणां सम्यक प्रतिपादनेत, देशकालात्मगुण विपरीतोपासनेनचेति। तस्मादात्महितंचिकीर्षतासर्वेणसर्वसर्व-दास्मृतिमास्थायसदवृत्तमनुष्ठेयम। (च.सू. 8/17)

In a healthy state (Prakruti), mind and sense organs are not disturbed and they perform their duties in a healthy way. In order to maintain mental health, one should make all positive efforts. This can be achieved by the performance of duties after dulyconsidering their pros and cons, with the help of the intellect (Buddhi), together with the sense organs (Indriya) applied to their respective objects (Indriya Artha). Acting against Desha Guna (qualities of habitat), Kala Guna (qualities of time) and Atma Guna (qualities of normalacy and abnormality of the body). Hence, one who is desirous of his own well being should follow all Sadvritta (good deeds).

Practices Preventing Psychosomatic Disturbances

तद्धयनुतिष्ठानयुगपतसंपाद्यत्यर्थंद्वयमाशोग्यमिन्द्रियविजयंचेति; तत सद्धृत्तमखिलेनोपदेक्ष्यामोऽग्निवेश! तद्यथा-देव गोब्राह्मणगुरुवृद्ध सिद्धाचार्यानर्चयेतअग्निमुपाचरेत। औषधीः प्रशस्ताः धारयेतछत्रीकालावृपम्मृशेत॥ (च.सू. 8/18)

One observes these principles simultaneously fulfills both the objectives,

1. Maintenance of positive health
2. Control of sense organs

One should respects to the Deva (god), Go (cow), Brahmin, Guru (preceptors), Vruddha (elderly peoples), Siddha Acharya (spirutual experts and experts teachers), Agnimupacharet (one should give due respects to fire) and Osadhih Prasasta Dharayet (one should wear good herbs). One should perform Sandhya Vandana (vedic rutuals in morning and evening twice).

मलायनेष्वभीक्ष्णंपाद्योश्चयैमल्यमादध्यात, त्रिः पक्षस्य-केशश्मश्रुलोमनखानसंहारयेत, नित्यमनुपहतवासाः सुमनाः सुगन्धिः स्यात, साधुवेशः, परसिद्धकेशः, मूर्धश्रोत्रघ्राण-पादतिअलनित्यः, धूमपः, पूर्वाभिभाषी, सुमुखः, दुर्गष्वभ्युपपत्ता.... (च.सू. 8/18)

One should clean excretory passages and feet frequently, one should cut hair, shave and nails thrice in fifteen days. One should wear good cloth, be happy, apply scent, wear good dress, comb the hair. Always apply oil to head, ears, nostrils and feet, one should smoke, take initiative in wishing, have a delightful face, protect people in affliction etc.

होता, यष्ट, दाता, चतुष्पथानांनमस्कर्ता, बलीनामुपहर्ता, अतिथीनांपूजकः, पितृभ्यःपिण्डदः, कालेहितमितमधुरार्थवादि, वश्यात्मा, धर्मात्मा, हेतीर्घ्नुः, फलेनेर्घ्नुः, निश्चिन्तः, निर्भीकः, ह्रीमान, धीमान, महोत्साहः, दक्षः, क्षमावान, धार्मिकः, आस्तिकः, विनयबुद्धि विद्याभिजलवयोवृद्ध सिद्धाचार्याणा-मुपासिता, छत्री दण्डी मौलीसोपानत्कोयुगमात्र-दृग्विचरेत्तमङ्गलाचारशीलः .... (च.सू. 8/18)

One should offer oblation, perform religious ceremonies, donate, respect to cross roads, offer Bali, honour the guests, offer Pinda Dana to fore fathers, has control the senses, measures sweet words, religious, desirous of work but not on the fruit, fearless, intelligent, enthusiasm, able forgive, pious, have faith in gods obedient, cleaver, learned, devoted to teachers, elders and sages, to prevents psychological disturbance. One who uses an umbrella, a stick, wears turban, shoes, person sees six feet forward while walking, who practices auspicious way can prevents many problems.

कुचेलस्थिकण्टकामेध्यकेशतुषोत्करभस्मकपालस्नानबलिभूमीनां परिहर्ता ..... (च.सू. 8/18)

One should avoid places with dirty cloths, bones, thorns, impure hair, grass, garbage, ash, broken pieces of earthen pot and the place of bath and worship.

प्राक श्रमाद्व्यायामवर्जीस्यात, सर्वप्राणिषुबन्धुभूतः स्यात, क्षुद्धानामनुनेता, भीतानामाश्वासयिता, दीनानामापत्ता, सत्यसंघः, सामप्रधानः, परुषकटुकवचनसहिष्णुः, अमर्षघ्नः,

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प्रशमगुणदर्शी, रागद्वेशहेतूनांहन्ताच ॥ (च.सू. 8/18)

One should stop exercise before exertion, be friendly to all creatures, settle the angry, console the frightened, care for poor, always speak truth, he should be compromising nature and tolerant towards unpalatable words by others, controller of intolerance, be of peaceful disposition and conquer the very roots of attachment and hatred.

Practices regarding code of general ethics (Dont's)

नानृतंब्रूयात, नान्यस्वमाददीत, नान्यस्त्रियमभिलषेन्नान्यश्रियं, नवैरंरोचयेत, नकुर्यातपापं, नपापेऽपिपापिस्यात; नान्यदोषान्ब्रूयात, नान्यरहस्यमागमयेन, नाधार्मिकैर्न नरेन्द्रविद्विष्टैः सहासीतनोन्मत्तैर्नपतितैर्नभ्रूणहन्तृभिर्न क्षुद्रैर्न दुष्टैः, न दुष्टयानान्यारोहेत, नजानुसमंकठिनमासनमध्यासीत, नानास्तीर्णमनुपहितमविशालमसमंवाशयनंप्रपद्येत, नगिरिविषममस्तकेष्वनुचरेत, नद्रुममारोहेत, नजलोग्रवेगमवगाहेत, नकूलच्छायामुपासीत, नाग्न्युत्पातमभितश्शेरत .... ।(च.सू. 8/19)

One should not tell a lie nor should take over other properties nor should long for others wives or property, should not indulge in hatred or sinful activities, one should never be vise even to the vicious, one should not disclose others defects, one should not disclose others secrets, one should shun the company of the unvirtuous, traitors, lunatics, fallen persons, abortionists, mean minded and crooked persons.

One should not ride dangerous vehicles, sit on a hard seat of knee height, sleep on the bed not well covered or without a pillow, small or uneven, one should not walk on the uneven slopes of the mountain, climb a tree, take bath in river having turbulent flow, one should not stamp on the shadow of kings or those born of noble families, one should not move around of fire.

नोच्चैर्हसेत, नशब्दवन्तंमारुतंमुञ्चेत, नानावृतमुकोजृम्भां क्षवथुंहास्यंवाप्रवर्तयेत, ननासिकांकुण्णीयात, तदन्तानविघट्टयेत, ननखान, वादयेत, नास्थीन्यभिहन्यात, नभुमिंविलिखेत, नछिन्द्यात्तृणं, न लोष्टं मृन्दियात, नविगुणमङ्गंशेष्टेत, ज्योतीष्यनिष्टमेध्यमशस्तं चनाभिवीक्षेत, नहुंकुर्याच्छ्वं, नचैत्यध्वजगुरुपूज्याशस्तच्छायाक्रामेत, न क्षपास्वमरसदनचैत्यचत्वरचतुष्पथोपवनश्मशानाघातनान्यासेवेत, नैकः शून्यगृहंनचाटवीमनुप्रविशेत, नपापवृत्तान, स्त्रीमित्रभृत्यानभजेत, नोत्तैर्विरुध्येत, नावगानुपासीत .... ।(च.सू. 8/19)

One should not laugh loudly, one should not release flatus with sound, one should not yawning, sneezing, laughing without covering his mouth, one should not itch the nostrils, grind the teeth, make sound the nails, strike the bones, scrape the earth, cut the straw, grind the clod of mud, maintain improper position of different parts of the body, one should not see the planets or an undesirable, impure object, produce 'hum' sound in front the dead body. One should not cross the shadow of sacred tree, a flag, teacher, a respectable person or an undesirable person; during nights, one should not enter the premises of temple, a sacred tree, public court yard, cross road, garden, cemetery and slaughter house, one should not similarly enter a deserted house or forest alone, one should not have relations with women, friends or servants of bad conducts, there should be no enmity with good men nor friend with bad ones.

न जिह्मंरोचयेत, नानार्यमाश्रयेत, नभयमुत्पादयेत, नसाहसातिस्वप्नप्रजागरस्नानपानाशनान्यासेवेत, नोर्ध्वजानुश्चिरंतिष्ठेत, न व्यालानुपसर्पेन्न दंष्ट्रिणोनविषणिनः, पुरोवातातपावस्यायातिप्रवाताञ्जह्यात, कलिंनारभेत, नासुनिभृतोऽग्निमुपासीत नोच्छिष्टः, नाधः कृत्वाप्रतापयेत, नाविगतक्लमोनानाप्लुतवदनोननग्नउपस्पृशेत, नस्नानशाट्यास्पृशेदुत्तमाङ्गं, नकेशाग्राण्यभिहन्यात, नोपस्पृश्यतेएववाससीबिभृयात, नास्पृष्ट्वारत्नाज्यपूज्यमङ्गल सुमनंसोऽभिनिष्कामेत, नपूज्यामङ्गलान्यपसव्यं गच्छेत्नेतराण्यनुदक्षिणम ॥(च.सू. 8/19)

One should not take interest crooked acts, should not take shelter with the uncivilized person, should not create fear, undue courage, excessive sleep, keeping awake at night in excess, bath, drink or food in excess quantity, one should not sit for long time with his knees up, one should not approach snakes or animals with dangerous teeth and horns, one should avoid easterly wind, sunlight, snow fall and storms, one should not initiate a quarrel, one should not worship fire except in lonely and when person is impure, one should not heat his body by keeping fire below, one should take bath unless he is free from exertion or without a gurgle or in a naked condition, one should not

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touch his head with the apparel worn at the time of bath or strike the tip of the hair. After taking bath one should not wear the same cloth worn before. One should not go out without touching gems, ghee, feet of respectable persons, auspicious objects and flower; one should not pass through by keeping respectable persons or auspicious objects in left or keeping other in right side.

Practice regarding taking diet

नारत्नपाणिर्नास्नातोनोपहतवासानाजपित्वानाहुत्वादेवता-भ्योनानिरुप्यपितृभ्योनादत्त्वागुरुभ्योनातिथिभ्योनोपाश्रितेभ्यो-नापुण्यगन्धोनामालीनाप्रक्षालित पाणिपादवदनोनाशुद्धमुखोनो-दग्मुखोनविमना नाभक्ताशिष्टाशुचि क्षुधित परिचरोन-पात्रीष्वमेध्यासुनादेशेनाकालेनाकीर्णेनादत्त्वाऽग्रमग्नयेना-प्रोक्षितंप्रोक्षणोदकैर्नमन्त्रैरनभिमन्त्रितंन कुत्सयन्न कुत्सितंन प्रतिकूलोपहितमन्नमाददीत, नपर्युषितमन्यत्रमांसहरितकशुष्क-शाकफलभक्ष्येभ्यः नाशेषभुकस्यादन्यत्र दधिमधुलवण-सक्तुसर्पिर्भ्यः, ननक्तंदधिभुञ्जीत, न सक्तूनेकानश्नीयान्न निशिनभुक्त्वान बहून्न द्वीर्नोदकान्तरितान, नछित्त्वा-द्विजैर्भक्षयेत ॥ (च.सू. 8/20)

One should not take food without wearing precious stones in hand or without taking bath or with torn apparel or without reciting Mantra or without offering oblation to the gods or without making offering to the fore- fathers, teachers, guests, dependents and applying sacred scents or without garlands or without washing hands, feet's and face or without cleaning the mouth or with face turned towards the north or with disturbed mind or surrounded by the insincere uncultured, dirty or hungry persons or in unclean dishes, or at improper place and time or in a place surrounded by many persons or without first offering the fire or without sprinkling with sacred water or without sanctifying it with sacred Mantras or with contemptuous disposition towards food. One should not take food which is dirty or which has been served by opponents.

Except in case of meat, roots, dry vegetables, fruits and sweets, one should not take staled food. One should not consume the entire food except in the cases of curd, honey, salt and roasted grain flour and ghee. One should not take curd at night. One should not take roasted grain flour without mixing it up with ghee and sugar, in night, after meals, in large quantity , twice daily, in between water intake, should not eat by tearing with teeth.

Practice regarding natural urges

नानृजुः क्षुयान्नाद्यान्न शयीत, नवेगितोऽन्यकार्यः स्यात, नवाय्वग्निसलिलसोमार्कद्विजगुरु-प्रतिमुखंनिष्ठिविका(वात) वर्चोमूत्राण्युत्सृजेत, न पन्थानमवमूत्रयेत्र जनवति नाग्रकाले, नजपहोमाध्यनबलिमङ्गलक्रियासु श्लेष्मसिङ्घाणकंमुञ्चेत ॥

(च.सू. 8/21)

One should not sneeze, eat and sleep in prone position, one should not attend to any other work while under the pressure of natural urge, one should not let out sputum, excreta or urine in front of the wind, fire, water, moon, sun, Brahmanas and teachers. One should not urinate on the roadside, public place, at the time of taking food, one should not let out oral or nasal excreta during chanting sacred mantras , religious rites, studies, religious offerings and auspicious activities.

Practice regarding relation with women

नस्त्रियमवजानीत, नातिविश्रम्भयेत, न गुह्यमनुश्रावयेत, नाधिकर्यात। नरजस्वलांनातुरांनामेध्यांनाशस्तां नानिष्टरुपा-रोपचारां नादक्षांनादक्षिणांनाकामांनान्यकामांनान्यस्त्रियंनान्य-योनिनायोनौन चैत्यचत्वर चतुष्पथोपवन श्मशानाघात-नसलिलौषधिद्विजगुरुसुरालयेषु नसन्ध्योएनातिथिषु नाशु-चिर्नाजग्ध भेषजोनाप्रनीत सङ्कल्पोनानुपस्थितप्रहर्षो नाभुक्तवान्नात्यशितो नविषनस्थोनमुत्रोच्चार पीडितोन श्रम व्यायामोपवासक्लमाभिहतोनारहसिव्यवायं गच्छेत ॥

(च.सू. 8/22)

Women should not be insulted, should not have too much faith in women, should not disclose secrets to women, should not endow her with authority, one should not perform sexual intercourse with women who is menstrual period, diseased, impure, having skin disorders, having undesirable features, actions and habits; unskilled, not favorable, not desire of sex and who is desirous of another person and others wife. Sexual intercourse in contraindicated other than vagina, not in place such as holy tree, Catvara, meeting of four roads, garden, burial ground, place of slaughter, reservoirs of water and herbs, house of

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Brahmana, teachers. Sexual acts should not be done in Sadhyakala, on prohibited days, not being clean, not eating medicine (Vajikara Dravya), without desire, without erection of penis, without taking food, after taking heavy meals, not keeping proper posture, under the pressure of urges of urine and faeces, when having exhaustion from physical exercise, fasting etc and at place devoid of privacy.

Practice regarding study

नसतोनगुरुनपरिवदेत नाशुचिरभिचारकर्मचैत्यपूज्यपूजाध्ययनमभिनिर्वर्तयेत ॥ (च.सू. 8/23)

Person should not lie to his teacher. While without being clean one should not perform acts of sorcery, worship of holy tree, holy objects and study.

नविद्युत्स्वनार्तवीषुनाभ्युदितासु दिक्षु नाग्निसंप्लवेनभूमिकम्पेनमहोत्सवेनोल्कापातेनमहाग्रहोपगमनेन नष्टचन्द्रायां तिथौनसन्ध्ययोर्नामुखाहुरोर्नावपतितं नातिमत्रंनतान्तंनविस्वरंनानवस्थितपदंनातिद्रुतंनविलम्बितंनातिक्लिवं नात्यच्चैर्नातिनीचैः स्वरग्रध्ययनमभ्यस्येत ॥ (च.सू. 8/24)

Study should not be during at the time of unseasonal lighting, quarters appears as though burning, not during outbreak of fire, during earthquake, great festivals, fall of meteors, eclipses of great planets, when moon is absent and during Sandhyakala. One should not study before teacher's initiation, one should not chants few words nor the large number of words, not with harsh words, not with improper words, not with words not forming sentences, not very slow, not very feeble voice, not very high pitch nor in very low pitch.

General Principles (Samanya Niyama)

नातिसमयं जह्यात, ननियमंभिन्द्यात, ननक्तंनादेशेचरेत, नसन्ध्यास्वभ्यवहाराध्ययनस्त्रीस्वप्नसेवीस्यात, नबालवृद्धलुब्धमूर्खक्लिश्टक्लिवैः सहसख्यंकुर्यात, नमद्यद्यूतवेस्याप्रसङ्गरुचिः स्यात, न गुह्यं विवृणुयात, नकञ्चिदयजानीयात, नाहंमानी स्यान्नादक्षो नादक्षिणोनासूयकः, न ब्राह्मणान परिवदेत, नगवांदण्डमुद्यच्छेत, नवृद्धान्न गुरुन्न गणान्न नृपानवाऽधिक्षिपेते, नचातिब्रूयात, न बान्धवानुरक्तकृच्छ्रद्वितीयगुह्याज्ञान बहिष्कुर्यात । (च.सू. 8/25)

One should not waste time, one should not break rules. One should not wander in prohibited places at nights. One should not indulge in partaking meals, study, sexual intercourse and sleep during Sandhya. One should not be in the company of children persons, who are very greedy, idiots, despised and poor mind. One should not be greatly interested in wine drinking, gambling, and prostitutes. One should not expose his genital/sexual organs greatly. One should not insult anybody, should not show him self as proud inefficient, uncivilized and jealous. One should not scandalize Brahmins should not drive the cows by beating with a stick. One should not insult old persons, preceptors, soldiers and king; one should not talk too much, should not abandon relatives, affectionate, who have helped in times of difficulty and who know the secrets of family.

नाधारोनात्युच्छ्रितसत्त्वः स्यात, नामृतमृत्यु; नाविश्रब्धस्वजनः, नैकः, सखी, नदुःखशीलाचारोपचारः, नसर्वाविश्रम्भी, नसर्वाभिशङ्की, नसर्वकालविचारी । (च.सू. 8/26)

One should not be ignorant and over bold, should not neglected dependents, one should not give up confidence in his own relatives, one should not enjoy alone, one should not have innate nature, learned behaviors and customs which cause discomfort to others, should not be confident in all, should not be suspicious on all, should not be always thoughtful.

Practice regarding self-control (Mano Vyaparaniyama)

नकार्यकालमतिपातयेत, नापरीक्षितमभिनिविशेत, नेन्द्रियवशगः स्यातनचञ्चलंमनोऽनुधावमदत, नबुद्धीन्द्रियाणामतिभारमादध्यात, नशोकमनुवसेत, नसिद्धावुत्सेकं यच्छेन्नासिद्धौ दैन्यं, प्रकृतिमवीक्षंस्मरेत, हेतुप्रभावनिश्चितः स्याद्धेत्वारम्भनित्यश्च, नकृत्यामित्याश्वसेत, नवीर्यं जह्यात, नापवादमनुस्मरेत ॥ (च.सू. 8/27)

One should not neglect too much of the proper time of actions, not undertake action without examining it, not become a salve to the all sense organs, not allow the mind to wander unsteadily; not impose too much of work to sense organs, not be thinking very far in all matters, not to do any activity in fit of anger or joy; not harbor sorrow for

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long time, not exhibit a great elation during success nor great dejection during failure.

One should always remember normal mode of events happening, faith in cause and effect. One should feel relieved that the work is complete; one should not lose spirit or remember the insults done earlier.

Practice regarding fire worship

नाशुचिरुत्तमाज्याक्षततिलकुशसर्षपैरग्निजुहुयादात्मान-माशीर्भिराशासानः, अग्निर्मेनापगच्छेच्छरीराद्वायुर्मेप्रानानाद धातुविष्णुर्मेबलमादधातुइन्द्रोमेवीर्य शिवामांप्रविशन्त्वापआपो-हिष्ठेत्ययः स्पृशते, द्विः परिमृज्योष्ठौ पादौचाभ्युक्ष्यमूर्धनि-खानिचोपस्पृशेदभिरात्मानं हृद्यं शिरश्च ॥ (च.सू. 8/28)

Without being clean, the person should not worship the fire by offering cow ghee, Akshata (unbroken and colored rice), Tila, Kusha grass and Sarshapa (mustard seeds); he should get himself blessed with benedictory hymns and then chant Mantra.

He should touch water and then touch twice the two lips, feet, head and opening of the head (eyes, ears, nostrils and mouth), heart and head.

Practice regarding social relations

ब्रह्मचर्यज्ञानदानमैत्रीकारुण्यहर्षोपेक्षाप्रशमपरश्च स्यादिति ॥ (च.सू. 8/29)

Person should follow Brahmacharya (abstinence), Jnana (good knowledge), Dana (charity), Maitri (friendship), Karunya (kindness), Harsha (joy), Upeksha (detachment) and Prashamana (peaceful of mind).

हिंसास्तेयान्यथाकामं पैशुन्यं परुषानृते । सम्भिन्नालापं व्यापादमभिध्यां दृग्विपर्ययम पापं कर्मेति दशधा कायवाङ्मनसैस्त्यजेत । (अ.हृ.सू. 1/22)

According Vagbhatacharya Sadavritta one should avoid the ten sins pertaining to the body, speech and mind :

- Himsa (causing injury, torture etc.)
- Asteya (stealing, robbing)
- Anyathakama (unlawful sex activity)
- Paishunya (abusive or harsh speech)
- Antra Vachana (scolding, speaking untruth)
- Sambhinna Alapa (speech causing dissent, separation, breaking of company)
- Vyapada (quarrel, intention of harming),
- Abhidya (jealousy, not tolerating good of others)
- Drugviparyaya (finding fault, misunderstanding, faithlessness etc. with scriptures, elders etc.)

One should not engage himself in occupations which are devoid of the three pursuit's Dharma (righteousness), Artha, (wealth) and Kama (pleasures). The personality of a person is enhanced by a good conduct. This could be a personal conduct or social conduct. A self-review could help to judge one's conduct. Ayurveda has discussed conduct, under the topic "Sadvritta". Here we find an elaborate discussion about personal and social behavior, one need to maintain.

A good personal conduct awards us good health and a control over our senses and desires. It includes a regime of bathing, cleaning of eyes, nose, ears, teeth, oral cavity, nails etc. Have a bath once or twice daily, as the season may be. Keep the nails and hair clean and well trimmed each fortnight or as the need be. Do not use unwashed clothes dirty or uncomfortable clothes, clothes worn by others, not appropriate to the season, occasion or clothes made from unnatural fiber. The footwear should be selected as per our physical structure, geographic condition, season and the type of job. One should have sufficient sleep, not over sleep or have late nights, have meals at regulated times which helps to have a pleasant mind set.

Do not cook food or serve food in unhygienic kitchen, utensils, without having a bath, with ill-thoughts or in grief. Do not have stale food or food not appropriate to the season. Do not make repulsive sounds with your mouth while talking or eating.

Now let's discuss about the conduct to be maintained while interacting in the society.

Do not accumulate garbage on streets, functions, places of worship, near water sources,

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public places like hospitals, parks, schools etc. Cover your mouth while laughing, coughing, sneezing, belching or yawning. Avoid combing hair in a public place. Do not pick your teeth or finger the nose or ear in the presence of people.

Don't be a witness to an unknown person. Respect the elders, forefathers, teachers, preachers, scholars etc Have a respectable, courteous and protective attitude towards elderly people, women, children those ailing, weak, physically challenged etc.

Avoid confronting those who are in a position to execute their power. Always share your joys and achievements with your well-wishers also don't be envious of others. Don't give authority to any unknown person that is don't rely on anyone completely, also don't be distrustful. Don't disclose anyone's secrets in public. Speak only when it's your turn, that too within the context and possibly the truth. Allow another person to express his views first in conversation. In case of disagreement, politely convey it.

Abstain from lies, anger, in extreme grief, jealousy, greed and sins that could be a result a lack of control of the above mentioned emotions. Do not indulge in gossip, ill-commenting, unhealthy criticism, enmity towards others. Do not mingle in the company of ill-mannered people or people with evil thoughts. In short we can say that these rules have been laid down to ensure personal hygiene, mental peace and good interpersonal relations.

Importance of Sadvritta

पञ्चपञ्चकमुद्दिष्टंमनो हेतुचतुष्टयम ।
इन्द्रियोपक्रमेऽध्याये सद्धृत्तमखिलेन च ॥
स्वस्थवृत्तं यथोद्दिष्टं यः सम्यगनुतिष्ठति ।
सममाः शतमव्याधिरायुषानवियुज्यते ॥
(च.सू. 8/30-31)

Those who follows description of sense organs five pentads, mind, four etiological factors and good conducts for maintenance of positive health devoid of all diseases, lives for hundred years and does not meet with an untimely death.

Acahra Rasyana (आचाररसायन)

सत्यवादिनमक्रोधंनिवृत्तं मद्यमैथुनात ।
अहिंसकमनायासंप्रशान्तंप्रियवादिनम ॥
जपशौचपरंधीरंदाननित्यंतपस्यिनम ।
देवगोब्राह्मणाचार्यगुरुवृद्धार्चने रतम ॥
आनृशंस्यपरंनित्यंनित्यंकरूणवेदिनम ।
समजागरणस्वप्नंनित्यं क्षीरघृताशिनम ॥
देशकालप्रमाणज्ञंयुक्तिज्ञमनहङ्कृतम ।
शस्ताचारमसंकीर्णमध्यात्मप्रवणेन्द्रियम ॥
उपासितारंवृद्धानामास्तिकानांजितात्मनाम ।
धर्मशास्त्रपरं विद्वान्नरं नित्यरसायनम ॥
गुणैरेतैः समुदितैः प्रयुङक्तेयोरसायन ।
रसायनगुणातसर्वानयथोक्तानससमश्नुते ॥
(च.चि. 1/4/30-35)

The Achara Rasayana significance physical and mental conducts of a man. Achara Rasayana described code of conducts which are equal to Rasayana therapy and been mentioned that those who follow Achara Rasayana they will get benefits of the Rasayana therapy.

Persons should speak always Satya (truth), should free from Krodha (anger), should not drink Madya (alcohol) and should not hurt no one physically, mentally. Should avoid Maithuna (sex indulgence), who do not indulge in violence (Himsa), Should away to Peaceful (Prashanta) and pleasing in their speech (Priyavadana).

Practice of Japa (one should devote himself chant), practices of Shouchadhari (always clean externally and internally), regularly practice of charity (Dana) and Tapas (penance). Regular offer prayers to gods, cows, Brahmans, teachers, perceptions and old people, Absolutely free from Barbarous acts, which are compassionate, Period of awakening and sleep are regular, habitually take milk and ghee, who are acquainted with the measurement of the country and the time, who are experts in the knowledge of rationality, who are free from ego, whose conduct is good, who are not narrow minded, who have love for spiritual knowledge, who have in excellent sense organs are

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conditions, who have reverence for old age persons, Astika (those who believe in the existence of God and validity of knowledge of the Vedas), and persons having self-control and who regularly study scriptures, gets the best out of rejuvenation therapy. Those are following these this person can like taking of Rasayana Sevana.

Characteristics of a Mentally Healthy Person, Warning Signals of Poor Mental Health, Types of Mental Illness and Causes of Mental Ill-Health

Characteristics of a Mentally Healthy Person-

1. A mentally healthy person has an ability to make adjustments.
2. A mentally healthy person has a sense of personal worth, feels worthwhile and important. He has self-respect, and feels secure in the group.
3. A mentally healthy person solves his problems largely by his own efforts and makes his own decisions.
4. He has a sense of personal security and feels secure in a group, shows understanding of other people's problems and motives.
5. A mentally healthy person has a sense of responsibility.
6. He can give and accept love.
7. He lives in a world of reality rather than fantasy. Reality rather than wishes or imaginary fears governs his behaviour.
8. He shows emotional maturity in his behaviour. This means that he is able to regulate such emotions as fear, anger, and love, jealous and expresses them in a socially desirable manner.
9. He is able to think for himself and can make his own decisions. He thinks clearly and constructively in solving problems.
10. A mentally healthy person has a variety of interests and generally lives a well-balanced life of work, rest and recreation.

Warning Signals of Poor Mental Health- Warning signals may be classified under general features, bodily sign and symptoms and behavioural signs and symptoms.

General features

1. Emotional unstable and easily upset.
2. Apprehensive suspicious and insecure.
3. Self-critical, empowered with a feeling of guilt
4. Lack of self-confidence and will power
5. Inadequate adjustment with the self and the environment physical, social and professional.
6. Failure in setting a proper level of aspiration
7. Suffering from frustrations, unresolved conflicts, strain and stresses.
8. Always remain in the state of over anxiousness
9. Lack of enduring power and tolerance
10. Lack of decision-making ability
11. Poor self-concept and achievement motivation.
12. Unrealistic attitude towards life and people.
13. Always dissatisfied with his achievements and tries to seek over perfection in his or others work.
14. Live in world of his own imagination and fantasy.

Bodily sign and symptoms- Back pain, change in appetite, chest pain, constipation or diarrhoea, high blood pressure, extreme tiredness, general aches and pains, headaches, light headedness, palpitation (the feeling that one's heart is racing), insomnia (trouble in sleeping), sexual problems, shortness of breath, stiff neck, sweating, upset stomach, weight gain or loss.

Behavioural signs and symptoms

1. Sudden change in mood or behaviour
2. Long-lasting sadness, aloofness or social withdrawal
3. Irritability and strong feelings of anger (frequent temper tantrums in children)
4. Excessive fear, worry or anxiety
5. Confused thinking, ill-logical reasoning, pessimistic thoughts and negative feelings
6. Paranoid (thinking that others are talking about him)

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7. Delusion or hallucination (seeing or hearing things that are not actually there)
8. Alcoholism, drug-abuse or chain smoking
9. Increased inability to cope with day-to-day problems and activity
10. Thinking about harming himself or attempting suicide
11. Dramatic change in eating or sleeping habits
12. Persistence nightmares or day-dreaming (dwelling on past events)
13. Reduced energy level and lose of interest or pleasure in activities formerly enjoyed
14. Difficulty in concentrating, remembering things and making decisions.

Types of Mental Illness and Causes of Mental Ill-health

There are many different conditions that are recognized as mental illnesses. The more common types include.

1. **Anxiety disorders**-People with anxiety disorders respond to certain objects or situations with fear and dread, as well as with physical signs of anxiety or panic, such as a rapid heartbeat and sweating. An anxiety disorder is diagnosed if the person's response is not appropriate for the situation, if the person cannot control the response, or if the anxiety interferes with normal functioning. Anxiety disorders include generalized anxiety disorder, panic disorder, social anxiety disorder, and specific phobias.
2. **Mood disorders**-These disorders, also called affective disorders, involve persistent feelings of sadness or periods of feeling overly happy, or fluctuations from extreme happiness to extreme sadness. The most common mood disorders are depression, bipolar disorder, and cyclothymic disorder.
3. **Psychotic disorders**-Psychotic disorders involve distorted awareness and thinking. Two of the most common symptoms of psychotic disorders are hallucinations.
4. **Eating disorders**-eating disorders involve extreme emotions, attitudes, and behaviors involving weight and food. Anorexia nervosa, bulimia nervosa, and binge eating disorder are the most common eating disorders.
5. **Impulse control and addiction disorders**-People with impulse control disorders are unable to resist urges, or impulses, to perform acts that could be harmful to themselves or others. Pyromania (starting fires), kleptomania (stealing), and compulsive gambling are examples of impulse control disorders. Alcohol and drugs are common objects of addictions. Often, people with these disorders become so involved with the objects of their addiction that they begin to ignore responsibilities and relationships.
6. **Personality disorders:** People with personality disorders have extreme and inflexible personality traits that are distressing to the person and/or cause problems in work, school, or social relationships. In addition, the person's patterns of thinking and behavior significantly differ from the expectations of society and are so rigid that they interfere with the person's normal functioning. Examples include antisocial personality disorder, obsessive-compulsive personality disorder.
7. **Obsessive-compulsive disorder (OCD)**-People with OCD are plagued by constant thoughts or fears that cause them to perform certain rituals or routines. The disturbing thoughts are called obsessions, and the rituals are called compulsions. An example is a person with an unreasonable fear of germs who constantly washes their hands.
8. **Post-traumatic stress disorder (PTSD)**-PTSD is a condition that can develop following a traumatic and/or terrifying event, such as a sexual or physical assault, the unexpected death of a loved one, or a natural disaster. People with PTSD often have lasting and frightening thoughts and memories of the event, and tend to be emotionally numb.

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9. **Stress response syndromes (formerly called adjustment disorders):** Stress response syndromes occur when a person develops emotional or behavioral symptoms in response to a stressful event or situation. The stressors may include natural disasters, such as an earthquake or tornado; events or crises, such as a car accident or the diagnosis of a major illness etc.
10. **Dissociative disorders:** People with these disorders suffer severe disturbances or changes in memory, consciousness, identity, and general awareness of themselves and their surroundings. These disorders usually are associated with overwhelming stress, which may be the result of traumatic events, accidents, or disasters that may be experienced or witnessed by the individual.
11. **Factitious disorders:** Factitious disorders are conditions in which a person knowingly and intentionally creates or complains of physical and/or emotional symptoms in order to place the individual in the role of a patient or a person in need of help.
12. **Sexual and gender disorders:** These include disorders that affect sexual desire, performance, and behaviour. Sexual dysfunction, gender identity disorder, and the paraphilias are examples of sexual and gender disorders.
13. **Somatic symptom disorders:** A person with a somatic symptom disorder, formerly known as a psychosomatic disorder or somatoform disorder, experiences physical symptoms of an illness or of pain with an excessive and disproportionate level of distress, regardless of whether or not a doctor can find a medical cause for the symptoms.
14. **Tic disorders:** People with tic disorders make sounds or display non-purposeful body movements that are repeated, quick, sudden, and/or uncontrollable. (Sounds that are made involuntarily are called vocal tics.) Tourette's syndrome is an example of a tic disorder.

Causes of Mental Ill-Health

1. **Genetic Factors:** Some mental illnesses have a genetic component, meaning they can run in families. Individuals with a family history of certain disorders may be at a higher risk.
2. **Brain Chemistry and Structure:** Imbalances in neurotransmitters (chemical messengers in the brain) can contribute to mental illness. Structural abnormalities or brain injuries can also play a role.
3. **Trauma and Stress:** Exposure to trauma or prolonged periods of high stress can increase the risk of mental health problems, including PTSD, depression, and anxiety disorders.
4. **Childhood Experiences:** Adverse childhood experiences, such as abuse, neglect, or family dysfunction, can have long-lasting effects on mental health.
5. **Biological Factors:** Physical illnesses or conditions, such as chronic pain, hormonal imbalances, or infections, can influence mental health.
6. **Substance Abuse:** Substance abuse, including alcohol and drug addiction, can exacerbate or lead to mental health disorders.
7. **Environmental Factors:** Living in a high-stress environment, experiencing social isolation, or dealing with economic hardship can contribute to mental ill-health.
8. **Personality Traits:** Certain personality traits, such as perfectionism or low self-esteem, can increase vulnerability to mental health issues.
9. **Life Transitions:** Major life changes, such as divorce, loss of a loved one, or job loss, can trigger or worsen mental health symptoms.

It's essential to understand that mental illness is complex, and the causes can vary significantly from one individual to another. Furthermore, many mental health conditions result from a combination of factors. Effective treatment and support often involve a holistic approach, addressing both the underlying causes and the symptoms.

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Mental Health Services and Comprehensive Mental Health Programme

The Mental Health Services module defines broad service areas separately so detailed definitions can be provided for each specific service area.

1. Ambulatory mental health services deliver mental health care to non-admitted consumers, including services at hospital outpatient clinics and non-hospital community mental health services, crisis or mobile assessment treatment services, and day programs. Services are streamed according to age groups.
2. Acute inpatient mental health services deliver mental health care to admitted consumers, usually on a short- to medium-term and intermittent basis. Services are streamed according to age groups.
3. Non-acute inpatient mental health services deliver mental health care to admitted consumers over a long-term period and involve a specialist rehabilitation component to care. Previously, many of these services have been known as extended treatment/care services. Services are streamed according to age groups.
4. Statewide and other targeted mental health services deliver a statewide, centrally coordinated mental health service and are defined separately for at least one of the following reasons:
   - They deliver statewide mental health care
   - They provide mental health care across the age spectrum
   - They deliver targeted mental health care programs for nominated populations.

Comprehensive mental health programme- The Government of India has launched the National Mental Health Program (NMHP) in 1982, keeping in view the heavy burden of mental illness in the community, and the absolute inadequacy of mental health care infrastructure in the country to deal with it.

The district Mental Health Program was added to the Program in 1996. The Program was re-strategized in 2003 to include two schemes, viz. Modernization of State Mental Hospitals and Up-gradation of Psychiatric Wings of Medical Colleges/General Hospitals. The Manpower development scheme (Scheme-A & B) became part of the Program in 2009.

Aims

1. Prevention and treatment of mental and neurological disorders and their associated disabilities.
2. Use of mental health technology to improve general health services.
3. Application of mental health principles in total national development to improve quality of life.

Objectives

1. To ensure availability and accessibility of minimum mental health care for all in the foreseeable future, particularly to the most vulnerable and underprivileged sections of population.
2. To encourage application of mental health knowledge in general health care and in social development.
3. To promote community participation in the mental health services development and to stimulate efforts towards self-help in the community.
4. To enhance human resource in mental health sub-specialties.

Components of a comprehensive mental health program may include:

1. **Public Awareness Campaigns**: Promoting mental health literacy, reducing stigma, and educating the public about the importance of mental well-being.
2. **School-Based Programs**: Implementing mental health education and prevention programs in schools to support the emotional and psychological development of children and adolescents.

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3. **Screening and Early Intervention**: Conducting regular mental health screenings to identify individuals at risk and provide early intervention.
4. **Access to Care**: Ensuring access to mental health services, including affordability and availability, through insurance coverage and public mental health programs.
5. **Workplace Wellness**: Implementing mental health initiatives in the workplace, such as Employee Assistance Programs (EAPs), to support employees' mental well-being.
6. **Community Support Services**: Developing community resources, including crisis lines, support groups, and peer-led initiatives, to promote mental health and resilience.
7. **Crisis Response**: Establishing crisis response systems to address acute mental health crises and emergencies.
8. **Research and Evaluation**: Ongoing research to assess the effectiveness of programs and interventions and to guide policy decisions.
9. **Policy and Legislation**: Advocating for policies and laws that support mental health and reduce discrimination.
10. **Collaboration**: Encouraging collaboration among healthcare providers, social services, schools, and other community stakeholders to provide a coordinated approach to mental health promotion.

Comprehensive mental health programs aim to create a society that fosters mental well-being, prevents mental illness, and ensures that individuals with mental health conditions receive timely and effective care.

Role of Trigunas and Satvajaya in Mental Health Promotion in Present Era.

The concepts of Trigunas and Satvavajaya play significant roles in mental health promotion, particularly in the context of holistic and complementary approaches to mental well-being. These concepts are rooted in ancient Indian philosophies and Ayurveda, and they continue to be relevant in the present era. Here's an overview of how Trigunas and Satvavajaya can contribute to mental health promotion in the modern world.

Sattva, Rajas and Tamas are concerned with the mental faculties and Vata, pitta and Kapha with the anatomical and physiological entities, and latter affect the psyche of an individual. The Characteristic features of Trigunas separately, The Sattva having quality of intelligence, virtue and goodness and creates harmony, balance and stability. It is light and luminous in nature. Responsible for inward and upward motion and brings about the awakening of the soul. It provides happiness and contentment hence we can say the sattva is the principle of clarity, wideness and peace.

The Rajas having quality of change, activity and turbulence and introduces the disequilibrium that upsets an existing balance. Rajas are stimulating and provide pleasure, owing to its unbalanced nature it quickly results in pain and suffering. Similarly, the Tamas Guna responsible for dullness, darkness, and inertia and heavy or obstructing in its action. It has depressed mood, lack of faith in God, lack of good conducts, intellectual lacking, ignorance, not attending to duties and sleepiness. Sattva is considered as pure and is not the cause of diseases. Rajas and tamas are the vitiators responsible for the manifestation of mental illness. Each individual has different temperament and mental personality based on the predominance of these universal attributes, along with the body humors, Vata, Pitta, and Kapha. Thus, all these Doshas can be regarded as factors having psychosomatic role to play.

Several causes are responsible for mental health some are - Social circumstances, Hereditary factors, Traumatic incidents, Personality of the person, Biological reasons, Improper diet, Physical illnesses and overindulgence, Severe mental or physical stress, Unfavourable -personal, familial and social environment. According to Ayurveda there is an imbalance in Tridosha and Trigunas of mind has causative factor. Excess of Shoka (sorrow), Krodha (anger), Chinta (unnecessary thinking), Kama (lust), Krodha (anger), Lobha (greed), Moha

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(delusion), Irshya (jealousy), Abhimana (pride), Mada (euphoria), Shoka (sorrow) and Bhaya (fear) are some of the negative emotions which can contribute to mental imbalance.

Satvavajaya Chikitsa is the non-pharmacological, therapeutic technique that is mentioned in the classical text for the management of mental disorders. It is the technique that focuses on the control of the mind or refraining the mind from undesired objects. As the complete description of Ayurvedic Psychotherapy mentions its utility is not only just in mental disorders but also in systemic disorders. The one-track cognition of using this treatment model just for treating disease might be slightly incorrect. The broader concept of using the principles and dimensions of Satvavajaya Chikitsa in day-to-day life is a way to man-age and cope with the challenges in life. Satvavajaya often incorporates yoga and pranayama (breath control) as tools to calm the mind and reduce stress. These practices can help individuals gain mastery over their mental states.

As the application of the Satvavajaya Chikitsa is not mentioned, we can try and apply this module to our daily habits. The code of conduct and Achara Rasayana both have a basic and easy methodology to gain a peaceful mindset. Dharniya Vega is the concept to be engaged in our behavioural patterns. The utilization of these techniques will assist our Minds to develop a virtuous mindset and will aid to build integrity.

Digital Health Promotion

Digital health, or digital healthcare, is a broad, multidisciplinary concept that includes concepts from an intersection between technology and healthcare. Digital health applies digital transformation to the healthcare field, incorporating software, hardware and services. Under its umbrella, digital health includes mobile health (mHealth) apps, electronic health records (EHRs), electronic medical records (EMRs), wearable devices, telehealth and telemedicine, as well as personalized medicine. Stakeholders in the digital health field include patients, practitioners, researchers, application developers, and medical device manufacturers and distributors. Digital healthcare plays an increasingly important role in healthcare today.

Digital transformation in Health-

1. Tele medicine
2. Electronic health record
3. Robot assisted surgery
4. Self-monitoring devices
5. The internet medical things (IoMT)
6. Mobile Health (m-Health)
7. Organs on ships.

Advantages of digital health

1. The patient enjoys digital data access
2. Quicker access to test results
3. Easy to pay the bills
4. Sharing of information with your family members
5. Offers clinicians notes feedback
6. Patient can review information for medical errors
7. Instructions and Information is simple and easy to document
8. Patient has a better approach and access to the medical records
9. Tool for health protection

Disadvantages of digital health

1. Complicated and complex health information causes concerns for the patients
2. Clinician's reports elevate patient provider's relationship concerns
3. Hackers can approach and access patient's records
4. It needs to be upgraded on a regular basis
5. Digital health records are expensive
6. Complex and composite processes

Health system challenges of Digital health-

1. Population denominator
2. Acceptance
3. Availability
4. Cost and utilization

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5. Quality
6. Efficiency

Digital health promotion has the potential to make healthcare more proactive, patient-centered, and efficient. However, it also comes with challenges related to data security, ensuring the quality of online health information, and addressing disparities in access to technology and digital literacy.

MCQ on Sadvritta

1. Which of the following is not true in case of manas
   A) Atindriyam B) Chetas
   C) Satva Sanjnakam D) None of the above
2. Panca Pancakam includes
   A) Pancendriyani
   B) Pancendriya Dravyani
   C) Pancendriya Adhisthhani
   D) Pancendriyartha
   E) All the above
3. Adhyatma Dravya Guna Samgraha includes
   A) Manas, Manoartha B) Buddhi, Atma
   C) Both D) None of the above
4. Subha, Asubha, Pravritti, Nivritti are due to
   A) Dravya Samgraha
   B) Hetu Samgraha
   C) Dosa Samgraha
   D) Adhyatma Dravyaguna Samgraha
5. The following is indicated during evening
   A) Ahara B) Nidra
   C) Maithuna D) Jagarana
6. What is the primary focus of Sadvritta in Ayurveda?
   A) Herbal medicine
   B) Code of conduct and ethics
   C) Physical exercises
   D) Meditation techniques
7. Sadvritta emphasizes the importance of maintaining harmony with:
   A) One's inner self B) Technology
   C) Fast-paced living D) Social media
8. Which of the following is NOT a key component of Sadvritta?
   A) Diet and nutrition B) Ethical behavior
   C) Physical fitness D) Mental well-being
9. The core principles of Sadvritta aim to:
   A) Promote unhealthy habits
   B) Foster a balanced and healthy lifestyle
   C) Encourage overindulgence in material pleasures
   D) Isolate individuals from society
10. Sadvritta advises individuals to follow a daily routine known as:
   A) Ayur-ritual
   B) Dincharya
   C) Fast-track lifestyle
   D) Unpredictable schedule

Answers on MCQ on Sadvritta

1. D	4. D	7. A	10. B
2. E	5. D	8. C	
3. C	6. B	9. B	

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Chapter 7

Ahara

Syllabus

Significance of Ahara for health and well-being according to Ayurveda & Contemporary science.

Learning objectives

Significance of Ahara for health and well-being according to Ayurveda & Contemporary science.

Total - 35 hours (Lecture :20 hour, Non-lecture: 15 hours)
MCQ- Yes- SAQ (5 Marks)- Yes- LAQ (10 Marks)- Yes

The Trayopasthmbhas are the subsidiary pillars, which support the body throughout the life span, by providing the qualities like Bala, Varna, Upachaya etc. they are considered as subsidiary or secondary as principal pillars of life are the three Doshas. But their importance in normal functioning of the body cannot be over looked. The Trayopastmbhas are Ahara, Nidra and Brahmacharya. Each one of these deserves due impotence because these factors are concerned with the basic needs of living system and over indulgence or total abstinence of any of these may be harmful to life. The Ahara is mainly concerned with the energy production and maintenance of living tissues. The Nidra is the one which provide complete relaxation to the body and mind and there it restores the potentials of the individual. The Brahmacharya is concerned with disciplined mode of sexual life and reproduction.

The maintenance of health and prevention from diseases can be achieved through food and lifestyle specific to individual needs and in line with the seasons and cycles of nature. Food and habits which are conducive to the body are known as Pathya. Food is referred as 'Mahabhaisajya' by Ayurvedic classics. Ayurveda described a large number of food and drinks, their method of preparation and the code and discipline of taking the food.

Ahara (आहार)

आहियतेइतिआहारः अन्नपादादि सर्वं । (शब्दकल्पद्रुम)

The substance which is to be taken in or swallowed in through the throat is called Ahara.

Derivation of Ahara

हनेहरणे - To be taken in.

Shabdastoma Mahanidhi - The Ahara is substances which build up the body.

Vaidyaka Shabdashindhu - Any substance which passes through the throat is called as Ahara.

Vachaspatyam - "आहियतेइत्याहार" means which is to be swallowed is called Ahara.

Anna is a popular and widely used synonym of Ahara. The word Anna meaning "to be taken in" or "which nourishes the body".

आहियतइत्याहारोभेषजमपि । (चक्रपाणि टिका च.सू. 26/85)

While commenting on the description of Ahita, Chakrapani has said that Ahara means which is ingested and thus it includes in itself both diet and drugs.

आहारसंभवंवस्तुरोगश्चाहारसंभवः ।
हिताहितविशेषात्तुविशेषोसुखदुःखयोः ॥
(च.सू. 28/45)

Human body is born from food and diseases

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are also produced by food; happiness and unhappiness depend on the use of suitable and unsuitable foods respectively.

अन्नं वृत्तिकराणां श्रेष्ठः । (च.सू. 25/40)

Among those which sustain life, Anna (food) is the best

न च आहारसमंकिञ्चिदौषज्यामुपलभ्यते ।
शक्यतेऽप्यन्नमात्रेण नरः कर्तुंनिरामय ॥
(का.खि. 4/5)

No medicine is equivalent to food. It is possible make person diseases free with just proper diet.

आरोग्यंभोजनाधीनं ..... । (का.खि. 5/9)

Health is dependent on food.

आहारः प्रीणनोसद्योबलकृद्देहधारकः ।
आयुस्तेजः समुत्साहस्मृत्योजोऽग्निविवर्धनम ॥
(सु.चि. 24/68)

The food enhances Prinana (vitality), Bala (strength) and Deha Dharaka (makes the body study). Food increases Utasah (enthusiasm), Smruti (memory), Agni, Ayu (life span), Teja (luster) and Ojus.

त्रयः ओपस्तम्भाः इत्याहारः स्वप्नो ब्रह्मचर्यमिति ।
(च.सू. 11/23)

Food is one among the three sub pillars supporting life.

प्राणाः प्राणभृतामन्नमन्नं लोकोऽभिधायति ।
वर्णः प्रसादः सौस्वर्यंजीवितंप्रतिभासुखम ॥
तुष्टिः पुष्टिर्बलं मेधा सर्वमन्ने प्रतिष्ठितम ।
लौकिकंकर्मयद्धृत्तौस्वर्गतौयच्चवैदिकम ॥
कर्मापवर्गेयच्चोक्तंतच्चाप्यन्ने प्रतिष्ठितम ॥
(च.सू. 27/349-350)

Prana (life of living being) is depending on Anna (food) and all creatures of the universe desire food. Varna (Complexion), Prasada (clarity), Sausvarya (good voice), Jivita (longevity), Pratibha/ Prajna (geniuses), Sukha (happiness), Tushti (satisfaction), Pushti (nourishment), Bala (strength) and Medha/ Dharanavati Dhi (intellect/ with holding capacity) are all conditioned by Ahara (food). Other activities like Loukika Karma Yad Vruttau (Professional activities leading to happiness in this world), Svargatau Vaudika Karma (Vedic rituals leading to abode in heaven), Apavarge Karma (activities leading to salvation).

हिताशिस्यान्मिताशिस्यातकालभोजीजितेन्द्रियः ।
पश्यनरोगानबहून कष्टान बुद्धिमानविषमाशनात ॥
(च.नि. 6/11)

Most of the incurable diseases are produced due to improper food. So intelligence and self-controlled man should take suitable food, in limited quality, at proper time to prevent diseases.

Food and nutrition is regarded as one of the indispensable aspects that leads to effective growth and development and health and wellbeing. Food provides the individuals with the energy that is needed in the implementation of tasks and activities. The individuals are able to treat various health problems and illnesses.

Syllabus- Classification of Ahara Dravyas as per Ayurveda & Contemporary science.

Learning objectives- Classify Ahara Dravyas as per Ayurveda & Contemporary science

Ahara Dravya Vargikaranam

(Ref-Cha. Su. 25/36, Su. Su. 46/3, Cha. Su. 27/5-7, A. H. Su. 5, B.P. Pu. 5)

परमतोवर्गसंग्रहेणाहरद्रव्याण्यनुव्याख्यास्यामः ॥
शूकधान्यशमीधान्यमांसशाकफलाश्रयान ।
वर्गानहरितमद्याम्बुगोरसेक्षुविकारकान ॥
दशब्दौचापरौवर्गौ कृतान्नाहारयोगिनाम् ।
रसवीर्यविपाकैश्चप्रभावैश्चप्रचक्ष्महे ॥
(च.सू. 27/6-7)

Categories of food substances, Shuka Dhanya, Sami Dhanya, Mamsa, Shaka, Phala, Harita, Madya, Ambu, Gorasa, Ikshu Vikara, Krutanna, Ahara Yogi Varga are described in respect of their Rasa, Virya, Vipaka and Prabhava.

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Sr. no.	Bhava Prakasha Chapter-6	Astanga Sangraha 5th and 6th Chapter Dravadravya Vijnaneeya	Astanga Hrudya 6th & 7th Chapter Annasvarupa Vijnaneeya	Sushruta Samhita Dravadravyav idhiadhyaya	Charaka Samhita Annapanavidhi adhyaya
1.	Shakavarga	Jalavarga	Shukadhanya	Paneeyavarga	Shuka Dhanya
2.	Mamsavarga	Ksheeravarga	Shimbhidhanya	Ksheeravarga	Sami Dhanya
3.	Kritannavarga	Ikshuvarga	Kritanna	Dadhivarga	Mamsa
4.	VariVarga	Madhuvarga	Mamsa	Takravarga	Shaka
5.	DadhiVarga	Tailavarga	Shaka	Ghritavarga	Phala
6.	TakraVarga	Madyavarga (A.H.)	Phala	Tailavarga	Harita
7.	NavanitaVarga	Mutravarga (A.S.)	Aoushadhavarga (A.H.)	Madhuvarga	Madya
8.	GhritaVarga			Ikshuvarga	Ambu
9.	Mutravarga			Madyavarga	Gorasa
10.	Tailvarga			Mutravarga	IkshuVikara
11.	Sandhanavarga			Mudgadivarga	Kritanna
12.	Ikshuvarga			Mamsavarga	Ahara Yogi
13.				Phalavarga	
14.				Shakavarga	
15.				Pushpavarga	
16.				Kanda varga	
17.				Lavanavarga	
18.				Kritannavarga	
19.				Bhakshyavarga	
20.				Anupanavarga	

According to fundamental composition of food

तत्र शालिषष्टिकमुद्गलावकपिञ्जलैणशशशरभशम्बरादीन्याहारद्रव्याणि प्रकृतिलघून्यपि मात्रापेक्षीणि भवन्ति । तथा पिष्टेक्षुक्षीरविकृतितिलमाषानूपौदकपिशितादीन्याहारद्रव्याणि प्रकृतिगुरूण्यपि मात्रामेवापेक्षन्ते । (च.सू.5/5)

Digestion of food depends upon the innate properties of food. There are mainly two categories of food according to their effect on digestion:

1. Laghu (Light to digest or quickly digestible food items)- The light to digest substances have a predominance of the qualities of Vayu and Agni Mahabhuta. Therefore, the light food-articles are stimulants of Agni owing to their innate quality, and are said to be less harmful even if they are eaten to a surfeit. Example- Shali (rice), Shashtika (Oryza sativa-a variety of rice that matures in 60 days), Mudga (green gram – Phaseolus mango Linn), Lava (Quail), Kapinjala (gray Partridge), Ena (Black antelop), Sasa (rabbit), Sarabha (wapiti), Sambara (Indian sambhara) etc. and such other food-articles are light to digest.

2. Guru (Heavy to digest or slowly digestible food items)- The heavy to digest substances have predominant qualities of Prithvi and Jala Mahabhuta. They do not stimulate Agni due to their properties. Thus, they can cause harm if taken in excess quantity. Strong digestive strength achieved by physical exercise is needed to digest them. Example- Pishta vikruti (flour products), Ikshu vikruti (Sugar cane products), Kshira Vikruti

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(Milk products), Tila (seasamum indicum), Masha (Black gram), Mamsa (meat) are inherently heavy to digest foods.

Classification of Ahara (Food) Dravya

तद्यथा–आहारत्वमाहारस्यैकविधमर्थाभेदात्; स पुनर्द्विधा-योनिः, स्थावरजङ्गमात्मकत्वात्; द्विविधप्रभावः हिताहितोदर्कविशेषात् चतुर्विधोपयोगः, पानाशनभक्ष्यलेह्यो-पयोगात् षड्रसत्वादः रसभेदतः षड्विधत्वात् विंशतिगुणः गुरुलघुशीतोष्णस्निग्धरूक्षमन्दतीक्ष्णस्थिरसरमृदुकठिनविशदपिच्छिल-श्लक्ष्णखरसूक्ष्मस्थूलसान्द्रद्रवानुगमात् अपरिसंख्येयविकल्पः द्रव्यसंयोगकरणबाहुल्यात् ॥ [Cha.Sa.Sutra Sthana 25/36]

Defined in general terms, food is the one which is consumed by living beings. By this virtue, food is only of one type.

I. According to Yoni (source), there are two types of food-

1. Sthavara - Vegetable products (the source which stays at only one place without movement)
2. Jangama - Animal products (the source which moves).

II. According to Udarka-later benefit of food articles, food is again be classified into two viz,

1. Hita - with ultimate wholesome effect and
2. Ahita - food that causes unwholesome effect

III. According to Upayoga (utility), food is of four types

1. Pana - drinks,
2. Ashana - eatables,
3. Bhakshya - solid eatable
4. Lehya - lickables

IV. According to Rasa (taste), food is of six types.

1. Madhura - Sweet
2. Amla - Sour
3. Lavana - Salt
4. Katu - Pungent
5. Tikta - Bitter and
6. Kashaya - Astringent.

V. According to Guna (quality)- 20 types-

Guru (heaviness) - Laghu (lightness)
Shita (cold) - Ushna (hot)
Snigdha (unctuousness, oiliness) - Ruksha (dryness)
Manda (dullness) -Tikshna (sharpness)
Sthira (stability) -Sara (mobility)
Mrudu (softness) -Kathina (hardness)
Vishada (non-sliminess, clarity) -Picchila (sliminess, Stickiness)
Shlakshna (smoothness) -Khara (roughness)
Sukshma (minute, subtleness)- Sthula (grossness, bulk)
Sandra (solidity) - Drava (liquidity).

Depending upon the Dravyasamyoga Karana Bahulya (combination of different food articles), the food types are Aparisankhyeya (innumerable).

According to forms of food (Charaka Sutra Sthana 28/3)

Food is of four types which are digested by Antaragni (digestive fire) are converted into Dhatu by Ushma (heat) and circulating throughout the body continuously as like Kala (time).

Different types of wholesome foods are categorized in four categories like

1. Ashita - eatables
2. Peeta - liquid foods
3. Lidha - linctus, jams,
4. Khadita - masticable foods.

The food gives Upachaya (body nourishment), Bala (strength), Varna (complexion to skin), Sukha (healthy life), Ayusha (improves life expectancy) and Sharira Dhatu Urjayati (growth of the body tissues).

Classification of foods

There are many ways of classifying foods :

1. Classification by origin –
   a. Food of animal origin
   b. Foods of vegetable origin
2. Classification by chemical composition-
   1. Protein
   2. Fats
   3. Carbohydrates
   4. Vitamins
   5. Minerals

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3. Classification by predominant function-
   1. Body- building foods- e.g. milk, meat, poultry, fish, eggs, pulses, ground nuts etc.
   2. Energy giving foods- e.g. cereals, sugar, roots tuber, fats and oil.
   3. Protective foods- e.g. vegetables, fruits, milks
4. Classification by nutritive value-
   1. Cereals and millets
   2. Pulses
   3. Vegetables
   4. Nuts and oil seeds
   5. Fruits
   6. Animal foods
   7. Fats and oils
   8. Sugar and jaggery
   9. Condiments and spices
   10. Miscellaneous foods
5. According to its mass depending on the quantity

1. **Macronutrients-** Required in large quantities daily. Proteins, carbohydrates and fats are macronutrients.
2. **Micronutrients-** Micronutrients are needed in small quantities (usually in amounts less than milligrams). These nutrients are involved in regulating metabolism and energy processes. They are vitamins and minerals.

Syllabus- Ahara Vidhi Vidhana, Ahara Sevana Kala & Dwadashashana Pravicharana.

Learning objective- Enumerate and explain the features of Ahara Vidhi Vidhana, Ahara Sevana Kala & Dwadashashana Pravicharana.

Ahara Vidhi Vidhana

(Ref- Cha. Vi. 1/24-25, B.P. Pu. 5, Su.Su. 46/458-481, A. S. Su. 3/46)

Ahara is not only needed for the continuity of life, but for Bala, Varna, Upacaya etc. also. The proper diet, taken in proper manner can lead to better health. On the contrary, proper diet if not taken in proper manner can lead to diseases. Ahara, as well as the method of its intake both have equal importance, according to Ayurveda. In other medical sciences, food is considered important, but not the manner of eating. In Ayurveda, proper methods of intake food as well as effects of improper methods of intake on body are also stated.

तत्रेदमाहारविधिविधानमरोगाणामातुराणां चापि केषांचित् काले प्रकृत्यैव हिततमं भुञ्जानानां भवति-उष्णं, स्निग्धं, मात्रावत्, जीर्णे वीर्याविरुद्धम्, इष्टे देशे, इष्टसर्वोपकरणं, नातिद्रुतं, नातिविलम्बितम् अजल्पन्, अहसन्, तन्मना भुञ्जीत, आत्मानमभिसमीक्ष्य सम्यक् । (च.वि. 1/24)

This is the rule for methods of food intake for healthy persons as well as to some of patients (unhealthy ones), who usually take timely wholesome food. One should eat only that food which is,

1. Ushna (Warm)
2. Snigdha (Unctuous)
3. Matravata (In proper quantity)
4. Jeerna Ahara (After the digestion of the previous meal)
5. Virya Viruddha Ahara (Not contradictory in potency)
6. Ishta Desha and Ishtasrvapakarana (In proper place equipped with all the accessories)
7. Ajalpana (Without talking)
8. Ahasana (Without laughing)
9. Tanmana Bhunjita (With concentration of mind)
10. Atmanama Abhisamikshya Samyaka (With paying due regard to oneself).

Ushna (Warm)

तस्यसादागुण्यमुपदेक्ष्यामः—उष्णमश्नीयात; उष्णंहिभुज्यमानंस्वदते, भुक्तंचाग्निमौर्ध्वमुदीरयति, क्षिप्रंजरांगच्छति, वातमनुलोमयति, श्लेष्माणंच परिह्रासयति; तस्मादुष्णमश्नीयात् ॥ (च.वि. 1/25/1)

One should take warm food. Advantages of taking Ushna Ahara are,

9. Tanmana Bhun

1. उष्णं हि भुज्यमानं स्वदते - When taken warm, it is delicious.

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2. भुक्तं चाग्निमौदर्यमुदीरयति - eaten food stimulates the digestive fire
3. क्षिप्रं जरां गच्छति- Gets digested quickly because it helps secretion of saliva and secretion of Gastric juice.
4. वातमनुलोमयति- Helps in the downward movement towards the passage of Vata and detachment of Kapha
5. श्लेष्माणं च परिहासयति- Helps in detachment of Kapha Therefore, one should eat Ushna (warm) food.

Snigdha (unctuous)

स्निग्धमश्नीयात् स्निग्धं हि भुज्यमानंस्वदते, भुक्तं चानुदीर्णमग्निमुदरीयति, क्षिप्रं जरां गच्छति, वातमनुलोमयति, शरीरमुपचिनोति, दृढीकरोतीन्द्रियाणि, बलाभिवृद्धिमुपजनयति, वर्णप्रसादं चाभिनिर्वर्तयति; तस्मात् स्निग्धमश्नीयात् ॥

(च.वि. 1/25/2)

One should take Snigdha Ahara (unctuous food). Advantages of taking Snigdha Ahara are :

1. स्निग्धं हि भुज्यमानं स्वदते - Unctuous food is delicious
2. भुक्तं चानुदीर्णमग्निमुदरीयति - Stimulates the power of digestion
3. क्षिप्रं जरां गच्छति - It gets digested quickly
4. वातमनुलोमयति - Helps in the downward movement of Vata
5. शरीरमुपचिनोति - Develops the body
6. दृढीकरोतीन्द्रियाणि - Provides firmness to sense organs
7. बलाभिवृद्धिमुपजनयति - Promotes strength
8. वर्णप्रसादं चाभिनिर्वर्तयति - Brings out the brightness of complexion Therefore, one should eat Snigdha (unctuous) food.

Matravata (In Proper Quantity)

मात्रावदश्नीयात्; मात्रावद्धि भुक्तं वातपित्तकफान-पीडयदायुरेव विवर्धयति केवलं, सुखं गुदमनुपर्येति, न चोष्माणमुपहन्ति, अव्यर्थं च परिपाकमेति; तस्मान्मात्रा-वदश्नीयात । (च.वि. 25/3)

One should take food in proper quantity. Advantages of taking food in proper quantity are,

1. मात्रावद्धि भुक्तं वातपित्तकफानपीडयदायुरेव विवर्धयति केवलं- Food taken in proper quantity without disturbing Vata, Pitta and Kapha only promotes longevity
2. सुखं गुदमनुपर्येति - Easily passes downward to anus
3. न चोष्माणमुपहन्ति - Does not disturb the power of digestion
4. अव्यर्थं च परिपाकमेति - Gets digested without any difficulty. Therefore, one should eat Matra-vata (in proper quantity) food.

Jirna Ashniyata (Intake after digestion of previous meal)

जीर्णेऽश्नीयात; अजीर्णं हि भुञ्जानस्याभ्यवहृतमाहारजातं पूर्वस्याहारस्य रसमपरिणतमुत्तरेणाहार रसेसेनोपसृजत सर्वान दोषान प्रकोपयत्याशु, जीर्णे तु भुञ्जानस्य स्वस्थानस्थेषु दोषेष्वग्नौ चोदीर्णे जातायां च बुभुक्षायां विवृतेषु च स्त्रोतसां मुखेषु विशुद्धे चोद्गारे हृद्ये विशुद्धे वातानुलोम्ये विसृष्टेषु च वातमुत्रपुरिषवेगेष्वभ्यवहृतमाहारजातं सर्वशरिरधातूनप्रदूषय-दायुरेवाभिवर्धयति केवलं; तस्माज्जीर्णेऽश्नीयात ।

(च.वि. 1/25/4)

One should take food only after previous meal get digested. If previous takes food before the digestion of the previous meal, the digestive product of the previous food, immature Rasa gets mixed up with the product of food taken afterwards, resulting in the provocation of all the Dosha instantaneously.

Signs of proper food digestion

1. जीर्णे तु भुञ्जानस्य स्वस्थानस्थेषु दोषेष्वग्नौ चोदीर्णे जातायां च- If food is taken after the digestion of the previous food while the Dosha are in their proper places and Agni (digestive enzymes) is provoked,
2. बुभुक्षायां विवृतेषु - Increase appetite
3. स्रोतसां मुखेषु -The entrances of the channels of circulation,
4. विशुद्धे चोद्गारे - Eructation is purified
5. हृदये विशुद्धे - Support heart to perform function
6. विशुद्धे वातानुलोम्ये - Clear the passage of Vata
7. विसृष्टेषु च वातमूत्र-पुरीषवेग - Proper manifestation and evacuation of the urges flatus urine and stool,
8. आहारजातं सर्वशरीरधातूनप्रदूषयदायुरेवाभिवर्धति केवल - Then the product of food does not vitiate the Dhatu of the body, but on the other hand it promotes longevity in its entirety. So one should take food only after digestion of the previous meal.

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Virya Aviruddha (No Contradictory Potencies)

वीर्यविरुद्धमश्नीयात; अविरुद्धवीर्यमश्ननहिविरुद्धवीर्याहारविकारैर्नोमुच्यते; तस्माद्विर्यादिरुद्धमश्नीयात।

(च.वि. 1/25/5)

One should take food having no contradictory potencies. By taking such food one does not get afflicted with such diseases as may arise from the intake of food having mutually contradictory potencies. Therefore, one should take food having no contradictory potencies.

Ishta Deshe, Ishta Sarvopakarane (in Proper place and with all accessories)

इष्टे देशे इष्टसर्वोपकरणं चाश्नीयात; इष्टे हिदेशेभुञ्जानो नानिष्टदेशजैर्मनोविघातकरैर्भावैर्मनोविघातं प्राप्नोति, तथेष्टैः सर्वोपकरणैः तस्मादिष्टे देशे तथेष्टसर्वोपकरणं चाश्नीयात।

(च.वि. 1/25/6)

One should take food in proper place equipped with all the accessories. By doing so a person does not get afflicted with such of the factors as would result in emotional strain which occurs when one takes his food in improper places without the required accessories.

Na Atidrutam (Not in hurry)

नातिद्रुतमश्नीयात; अतिद्रुतं हि भुञ्जानस्योत्स्नेहनमवसादनं भोजनस्याप्रतिष्ठानं च, भोज्यदोषसाद्गुण्योपलब्धिश्च न नियता; तस्मादत्रातिद्रुतमश्नीयात॥ (च.वि. 1/25/7)

One should not take food too hurry or fast. If food is taken too fast it enters into a wrong passage; it does not enter into the stomach properly. In this situation one can never determine the taste of food articles and detect foreign bodies, mixed with them. Therefore one should not eat too fast/hurry.

Na Ativilambitam (not too slowly)

नातिविलम्बितमश्नीयातः अतिविलम्बितं हि भुञ्जानो न तृप्तिमधिगच्छति, बहुभुङ्क्ते, शीतीभवत्याहारजातं, विषमं च पच्यते; तस्मान्नातिविलम्बितमश्नीयात॥ (च.वि. 1/25/8)

One should not take food very slowly because this will not give satisfaction to the individual. In this situation he would take more than what is required; the food would become cold and there will be irregularity indigestion. Therefore, one should not take food very slowly.

Ajalpana, Ahasana, Tanmana (With concentration)

अजल्पन्नहसन तन्मना भुञ्जीत; जल्पतो हसतोऽन्यमनसो वा भुञ्जानस्य त एव हि दोषा भवन्ति, य एवातिद्रुतमश्नतः; तस्मादजल्पन्नहसंस्तन्मना भुञ्जीत॥ (च.वि. 1/25/9)

One should not talk or laugh or be unmindful while taking food. One taking food while talking, laughing or with detracted mind subjects to the same trouble as the one eating too hurriedly. So one should not talk, laugh or be unmindful while taking food. Thus Dosha moves in upward direction abnormally.

Atmanam Abhisamikshya (With paying due regard to oneself)

आत्मानमभिसमीक्ष्य भुञ्जीत सम्यक; इदं ममोपशेते इदं नोपशेते इत्येवं विदितं ह्यस्यात्मन आत्मसात्म्यं भवति तस्मादात्मानमभिसमीक्ष्य भुञ्जीत सम्यगिति॥ (च.वि. 1/25)

One should take food in a prescribed manner; with due regard to his own self. This is suitable or unsuitable for me if known in this way then only it becomes suited to one self. Hence one should eat after considering his self well.

Ahara Sevana Kala

Annakala refers to the timing of meal. There have been lot of discussion over the meal timings in the recent past. In Western culture, it is a common idea that the daily food intake should be divided into three square meals: breakfast, lunch, and dinner, which is most commonly followed even in India. However, the number of meals is not a universal standard. As an example, the Ancient Romans had only one substantial meal, usually consumed at around 16:00 hrs, and they believed that eating more than once per day was unhealthy.

Acharya Sushruta recommends once a day meal for those with Mandagni (weak digestive capacity) and twice a day meal for those with the normal digestive power. Food taken in the morning should get digested by the evening and the food taken during the evening should get digested by the nest morning. When more food is taken into

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the body that can be processed in one sitting, it is said to dampen the digestive fire. On the contrary, it is also important to consider that under eating can lead to an impairment of the digestive fire as well, due to underuse and malnutrition of bodily tissues. Sarvagraha (Quantity of food for 1 meal) and Parigraha (quantity of each of its ingredients in a meal) are both important factors to be considered for portion size. Ayurveda texts gives an analogy for deciding the total quantity of food to be taken during a meal.

One should eat only when the previous meal is digested. If one eats before earlier meal is digested, mixing with undigested food quickly aggravates all dosha. Eating after digestion of previous meals is important to maintain equilibrium of dosha, normal digestion and metabolism and appetite. It helps in cleansing of body channels, pure eructation, normal functioning of heart, normal natural urges to expel body wastes and prevent obstruction to their passage. Thus, it enhances longevity by maintaining quality of dhatu (body components).

Dwadashashan Pravicharana

अत ऊर्ध्वं द्वादशाशनप्रविचारान वक्ष्यामः। तत्र शीतोष्ण स्निग्ध रुक्ष द्रव शुष्कैककालिक द्विकालिकौषधयुक्त मात्राहीन दोषप्रशमनवृत्त्यार्थाः ॥ (सु.उ. 64/56)

Sushruta Acharya describes the twelve kinds of food such as Sheeta, Ushna, Snigdha, Ruksha, Drava, Shushka, Eka Kala, Dvikala, Aushadhayukta, Matra Hina, Doshaprashamana and Vrtyartha.

Sheeta Guna Ahara

तृष्णोष्णमददाहार्तान रक्तपित्तविषातुरान।
मूर्च्छार्तान स्त्रीषु च क्षीणान शीतैरन्नैरुपाचरेत ॥
(सु.उ. 64/57)

Person suffering from Trishna (thirst), Ushna (heat), Mada (alcoholism), Daha (burning sensation), Raktapitta (bleeding disease), Visha (poison), Murccha (fainting) and Strishu Kshina (emaciated from copulation) should be treated by cold foods.

Ushna Guna Ahara

कफवातामयाविष्टान विरिक्तान स्नेहपायिनः।
अक्लिन्नकायांश्च नरानुष्णैरन्नैरुपाचरेत ॥
(सु.उ. 64/58)

Those suffering from diseases produced by Kapha and Vata, who have had Virikta (purgation), who are drink Sneha, are very Aklinna (dry) should take food with warm foods.

Snigdha Ahara

वातिकान् रुक्षदेहांश्च व्यवायोपहतांस्तथा।
व्यायामिनश्चापि नरान स्निग्धैरन्नैरुपाचरेत ॥
(सु.उ. 64/51)

Persons with Vata Prakruti, Ruksha Deha (dry skin), Vyavaya Upahata (exhaustion by sexual intercourse), Vyayama (performing lot of physical exercise) should be treated with Snigdha Ahara.

Ruksha Ahara

मेदसाऽभिपरीतांस्तु स्निग्धान्मेहातुरानपि।
कफाभिपन्नदेहांश्च रुक्षैरन्नैरुपाचरेत ॥
(सु.उ. 64/60)

Peoples suffering from Medaroga, have been Snehana, suffering from Prameha, who have Kapha in the body should be treated with Ruksha Ahara.

Drava Ahara

शुष्कदेहान पिपासार्तान दुर्बलानपि च द्रवैः।
(सु.उ. 64/61)

Persons who are having Shushka Deha (dryness of the body), suffering from Pipasa (thirst), Durbala (debility) should be treated with Drava Ahara.

Shushka Ahara

प्रक्लिन्नकायान व्रणिनः शुष्कैर्मेहिन एव च ॥
(सु.उ. 64/61)

Person having lots of Kleda, suffering from Vrana (wound) and Prameha should treat with Shushka Ahara.

Eka Kala Ahara

एककालं भवेद्देयो दुर्बलाग्नि विवृद्धये।
(सु.उ. 64/62)

Person having Durbala Agni (weak digestive fire) eat once in a day (Ekakala).

Dvikala Ahara

समाग्नयेतथाऽऽहारो द्विकालमपि पूजितः ॥
(सु.उ. 64/62)

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Person having Samagni (normal digestive fire) should eat twice a day(Dvikala).

Aushadhayukta Ahara

औषधद्वेषिणे देयस्तथौशधसमायुतः । (सु.उ. 64/63)

If the patient has aversion for particular medicine, it should be mixed with food and given to him.

Matra Hina Ahara

मन्दाग्नये रोगिणे च मात्राहीनः प्रशस्यते ॥
(सु.उ. 64/63)

Patients having Mandagni (low digestive fire) and Rogi (sick) should eat small quantity of food.

Doshaprashamana Ahara

यथर्तुस्त्वाहारो दोषप्रशमनः स्मृतः । (64/57-64)

Foods consumed appropriate- suitable to season and place is Dosha Prashamana.

Vrtyartha Ahara

अतः परम् तु स्वस्थानां वृत्त्यर्थं सर्व एव च ।
प्रविचारानिमानेवं द्धादशात्र प्रयोजयेत ॥
(सु.उ. 64/57-64)

All food consumed by the healthy person is meant to maintain health and life. Considering these twelve aspects ingestion of food should be planned.

Syllabus- Applied aspect of Pathyahara, Apathyahara, Samashana, Adhyashana, Vishamashana.

Leaning objective- Discuss the applied aspect of Pathyahara, Apathyahara, Samashana, Adhyashana, Vishamashana.

Applied Aspect of Pathyahara, Apathyahara, Samashana, Adhyashana, Vishamashana

Pathya and Apathya Ahara

Ayurveda prescribes specific diet patterns in the diseased conditions which are known as Pathya. According to the principles of Ayurveda, derangement of the digestive power (Agni) occurs in many diseases which is the prime reason for the formation of vitiated Dosha, Ama (toxic substances) and malformation of Dhatus (body tissues). Hence it is important to restore normalcy of the digestive power. This objective can be attained by using a properly managed diet regimen according to condition of Doshas and type of the disease.

पथ्यं पथोऽनपेतं यद्यच्योक्तं मनसः प्रियम ।
यच्चाप्रियमपथ्यं च नियतं तत्र लक्षयेत ॥
मात्राकालक्रियाभूमिदेहदोषगुणान्तरम ।
प्राप्य तत्तद्धि दृश्यन्ते ते ते भावास्तथा तथा ॥
तस्मात् स्वभावो निर्दिष्टस्तथा मात्रादिराश्रयः ।
तदपेक्ष्योभयं कर्म प्रयोज्यं सिद्धिमिच्छता ॥
(च.सू. 25/45-47)

Pathya (wholesome food) is the one, the substance and regime which are Anapeta (harmless) to Patha (doshas and tissues of the body which are moving in the channels and the substance and regimen) which are Manasah Priyam (which is liked by the person) are known as Pathya (wholesome). The substance and regimen which are Apriya (not like by person) and Apathy (unwholesome) should not be consumed. Hita (wholesome) and Ahita (unwholesome) Ahara (food) and Achara (depend upon) Matra (dosage), Kala (season), Kriya (method of preparation), Bhumi (place), Deha (body) and Dosha. Hence, Swabhava (innate nature) which depends upon above said Matra (quantity) etc. are explained. Physician who desires Siddhi (accomplishment) should consider Swabhava (innate nature) and Matra (quantity) etc before starting the treatment.

पथ्यम रोगिणाम हितकारम अपथ्यं संहारः । (शब्दकल्पद्रुमम)

Sharangdhara Acharya explains about some Pathya Kalpana like Manda, Peya, Vilepi, Yavagu etc. These Kalpanas are generally used in different diseases according to state of disease and capacity to digest the food in that disease. It also helps to maintain proper Agni (digestive fire) so as to digest food properly and give needed nutrition to tissues of body. It will also help to avoid formation ofAma which is often triggered when Agni (digestive fire) becomes low. Below table explains in short about Pathya Kalpana, their preparation method and uses in therapeutic diet.

आहारं पडिवधं चूष्यं पेयं लेह्यं तथैव च ।
भोज्यं भक्ष्यं तथा चव्यं गुरु विद्याद्यथोत्तरम ॥
(भा.प्र. 5/134)

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Food is of six kinds, Cushya (suck ables), Peya (drinks), Lehya (lick able), Bhojya (eatable), Bhakshya (eatables snacks) and Carvya (chewable) each succeeding one harder for digestion than proceeding.

आलोक्य वैद्यतंत्राणि यत्नादेव निबध्यते ।
व्याधितानां चिकित्सार्थं पथ्यापथ्यविनिश्चयः ।
निदनौषधपथ्यानि त्रीणि यत्नेन चिन्तयेत ।
तेनैव रोगाः शीर्यन्ते शुष्के नीर इवाङकुराः ॥
(योगरत्नाकर)

In Yogaratnakara Acharya said that for the treatment of diseases aetiology, drug treatment and Pathya are three important factors which should be studied thoroughly before starting the treatment. Judicious planning of treatment by proper understanding of these three factors always yields a successful eradication of disease. Yogaratnakara Acharya uses the metaphor of Ankura (seedling) is used for progressive form of disease. This Ankura will dry and be destroyed if it is not nourished by water; similarly disease will be destroyed if a patient does not consume Apathya Ahara.

Pathya Kalpana	Method for preparation	Uses
Manda	The filtered liquid portion obtained after boiling one Carminative, Digestive part of rice and fourteen parts of water	Carminative, digestive.
Peya	One part of rice and fourteen parts of water, boiled into Quickly digestible, Stops loose watery consistency	Quickly digestible, stops loose motions, Nourishes the tissues.
Vilepi	One part of rice and four parts of water, cooked into Strengthening, Nourishing, Good for thick paste	Strengthening, nourishing, good for heart, Delicious, Diuretic
Yavagu	One part of grain rice etc. and six parts of water, Strengthening, Nourishing cooked into thick paste	Strengthening, nourishing

कृत्वा सर्वास्वपथ्यानि तथास्वं परिवर्जयेत ।
तास्वपथ्यैर्विवर्धन्ते तोयदैरिव वीरुधः ।
विनाऽपि भैषजैर्व्याधिः पथ्यादेव विलीयते ।
न तु पथ्यविहीनस्य भैषजानां शतैरपि ॥
(योगरत्नाकर)

In all diseases Apathya should be avoided becauseApathya is predisposing factor for various diseases and helps in fast progression of patho-physiology. As climbers and plants grow in rainy season similarly diseases will increase due to Apathyas. Only Pathya also can cure diseases but one who does not follow Pathya cannot be cured by the use of hundreds of drugs.

Bhela Samhita also explains about merits of Pathya and demerits of Apathya in the Sutrasthana. Pathya Ahara nourishes all Dhatus and Srotasa leading to complete nutrition of body. Pathya Ahara also helps to detoxify the body by getting rid of vitiated Dosha. Contrary to this, Apathya Ahara helps in vitiation of Vata etc. Doshas. Hence for maintenance of health and treating diseases Pathya Ahara should be consumed.

एवमेव च भोज्येन पथ्येन आप्यायते ।
नरः हीयते चाप्यपथ्येन प्रदुष्टैः मारुतादिभिः ॥
स्वस्थस्यान्नेन वर्धन्ते धातवः शोणिताद्याः ।
व्याधितस्यापि दोषाय भोज्यं परिणमत्यथ ॥
यथा ह्यकालवृष्ट्या चभूमौ बीजं विपद्यते ।
वर्धते कालवृष्ट्या च देहिनोऽपि तथा रसैः ॥
(भेलसंहिता सूत्र 5/14-16)

All these benefits of Pathya Ahara can be ripped off with the help of Kritanna Varga described in various ancient texts. Properties of these Kritanna differ from each other depending upon the method of preparation even if material used is the same. In case of Manda, Peya, Yavagu and Vilepi, the amount of water used for cooking and then amount of liquid and solid content is different for each of

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them. This determines qualities like heaviness or lightness of food for digestion etc. If all the Kritanna Varga is used judiciously along with the Pathya Ahara then it will help to treat and nourish patient effectively.

भोजनाग्रे सदा पथ्यं लवणार्द्रक भक्षणम्।
अग्निसंदीपनं रुच्यं जिह्वाकण्ठ विशोधनम॥
(भा.प्र.पू. 5/130)

These Pathya Ahara are described specific to a particular disease condition as well as there are some Pathya mentioned which can be followed regularly for healthy individuals irrespective of disease condition. According to Bhavaprakasha taking ginger and salt before food is always good and it enhances Agni, taste, clears tongue and throat. Charaka andVagbhata Acharya also describe some regularly consumable food articles. Rakta Shali, Mudga, rain water, Saindhava (rock salt), Jivanti, meat of Aja, Godha, Rohita Matsya, cow's ghee, cow's milk, Tila Taila, ginger, grapes, pomegranate and sugar are considered as most conducive among food articles. Disease specific Pathya (wholesome diet) and Apathya (unwholesome diet) are explained in various classical texts like Charaka Samhita, Sushruta Samhita, Ashtanga Hridaya etc. but there are detailed descriptions about them in other texts like, Sharangdhara Samhita, Pathyapathya Vibodhika, Bhaishajyaratnavali and Chakradatta etc.

अतः सर्वप्राणिनामयमाहारार्थ वर्ग उपदिश्यते; तद्यथा- रक्तशालि षष्टिक कङ्कुकमुकुन्दकपाण्डुकपीतकप्रमोदककाल-कासनकपुष्पककर्दमकशकुनाहृतसुगन्धककलम नीवारकोद्रवो-दालक श्यामाक गोधूम यव वैणवैणहरिणकुरङ्ग मृग मातृका श्वदंष्ट्राकरालक्रकर कपोत लाव तित्तिरि कपिञ्जलवर्तीरवर्तिका मुद्ग वनमुद्ग मकुष्ठ कलाय मसूर मङ्गल्य चणक हरेण्वाढकीसतीनाशिचल्लि, वास्तुक सुनिषण्णक जीवन्ती तण्डुलीयक मण्डूकपर्ण्यः, गव्यं घृतं, सैन्धवं, दाडिमामल-कमित्येष वर्गः सर्वप्राणिनां सामान्यतः पथ्यतमः। (सु.सू.20/5)

Following group is perscribed as Pathya (diet) for allpersons as Rakta Shali, Shashtika, Kanguka, Makundaka, Panduka, Pitaka, Pramodaka, Kalakasa, Asanapushpaka, Kardamaka, Sakunahrita, Sigandhaka, Kamala, Nivara, Koda, Shyamaka, Godhuma, Yava, Vaina, Ena, Harina, Mrugamatrika, Swadamshtra, Karala, Krakara, Kapota, Lava, Tittiri, Kapinjala, Vartira, Vartika, Mudga, Vanamudga, Makushtha, Kalaya, Mangalya, Chanaka, Harena,Adhaki, Satina, Chilli, Vastuka, Sunisannaka, Jivanti, Tanduliya, Mandukaparni, Gavya Ghrita, Saindhava, Dadima, Amalaka is genarally most wholesome for all persons.

Vihara

Walking, travelling, exercise, control on emotions, supresing urges, sleeping time in this way, according to properties of Ahara and Vihara, we can maintain the equilibrium of Dosha, Dhatu and Mala to treat and prevent diseases.

Samashana, Adhyashana And Vishamashana

Samashana, Adhyashana And Vishamashana.

समशनं, अध्यशनं विषमाशन-
मिश्रं पथ्यमपथ्यं च भुक्तं समशनं मतम।
विद्यादध्यशनं भूयो भुक्तस्योपरि भोजनम॥
अकाले बहु चाल्पं वा भुक्तं तु विषमाशनम।
त्रीण्यप्येतानि मृत्यं वा घोरान व्याधीनसृजन्ति वा॥
(अ.ह.सू. 8/33-34)

The difference in features and time of ingestion of food causes disorder. Acharya had divided these features into three type's viz. Adhyashana, Samashana, Vishamashana.

Adhyashana - Intake of meals before complete digestion of previously taken meal.

Samashana - Consumption of suitable and unsuitable food together.

Vishamashana- Overtaking, lesser eating and eating untimely.

Vishamashana is divided into two parts i.e., untimely food and taking meal in improper quantity. Taking food untimely is too of two types, one is taking food before time of meal, a person should not take his meal before time even if digestion of previously taken meal has completed. If the digestion of meal taken in morning has not

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do completed even then person can take his evening meal. But person should not do this regularly; he should take meal in evening only in case of little indigestion. Indigestion of food after normal time of meal is comes in category of untimely meals. The second type Vishamashana is taking meals in improper quantity i.e., taking very low diet or overtaking. All these four described above are part of Vishamashana.

Syllabus- Ahara and vihara leading to Santarpanajanya Evam Apatarpanajanya Vyadhi and Importance of Upavasa and concept of intermittent fasting.

Learning objectives- Discuss the Ahara & vihara leading to Santarpanajanya Evam Apatarpanajanya Vyadhi and importance of Upavasa and effects of practice of intermittent fasting on health.

Santarpanajanya evam Apatarpanajanya Vyadhi

The word Santarpana means the act of satiating, restoration or refreshing. In this context, the term is used for overeating or overnutrition. Dietary items that are Prithvi and Apa Mahabhuta dominant lead to Santarpana. Certain food products' quality, quantity, and age might change how easily they can be digested. For example, older grains are easier to digest than new grains. As a result, whereas the same amount of aged food grains does not raise weight, new food grains tend to do so. It is necessary to study the changes that take place when grains age and their mode of operation.

सन्तर्पणजन्य रोगाणां निदान–

संतर्पयतियः स्निग्धैर्मधुरैर्गुरुपिच्छलैः ।
नवान्नैर्नवमद्यैश्च मांसैश्चानूपवारिजैः ॥
गोरसैर्गौडिकैश्चान्नैः पैष्टिकैश्चातिमात्रशः ।
चेष्टाद्वेषी दिवास्वप्नशय्यासनसुखेरतः ॥
रोगास्तस्योपजायन्तेसन्तर्पणनिमित्तजाः ।

(च.सू. 23/3-4)

The causes for Santarpaniyan Roga (over saturation) are the Person indulging in over nourishment with Snigdha (unctuous), Guru(heavy), Madhura (sweet), Picchila (slimy), Navanna (newly harvested rice), Nava Madya(fresh wine), Anupa Varija Mamsa (Meat of Anupa and Varija animals), Gorasa (Cow's milk and its preparations), Gaudikai Cha Anna (food preparations made of Jaggery), Pishtanna (flour preparations), Cheshta Dveshi (averse to physical activity), Divaswapna (sleep during daytime), Shayasana Sukhe Ratah (keeps lying on the bed or sitting at ease all the time).

सन्तर्पणजन्य रोग–

प्रमेहपिडकाकोठकण्डूपाण्डूवामयज्वराः ।
कुष्ठान्यामप्रदोषाश्चमूत्रकृच्छ्रमरोचकः ।
तन्द्राक्लैब्यमतिस्थौल्यमालस्यंगुरुगात्रता ।
इन्द्रियस्त्रोतसांलेपोबुद्धेर्मोहः प्रमीलकः ।
शोफाश्चैवंविधाश्चान्येशीघ्रमप्रतिकुर्वतः ।

(च.सू. 23/5-7)

Prameha (diabetes), Prameha Pidika (carbuncles), Kotha (Urticaria), Kandu (itching), Pandu (Anaemia), Jwara (fever), Kustha (skin disease), Amapradosha (diseases due to Ama example-Alasaka and Visuchika), Mutrakruccha (difficulty in micturation), Arochaka (loss of appetite), Tandra (drowsiness), Klaibya (infertility), Atisthaulya (excessive obesity), Alasya (laziness), Gurugatrata (heaviness of body), Indriya Srotasm Lepa (coating of channels in sensory organs), Buddhermoha (confusion), Pramilaka (continuous thinking), Sopha (Swelling) and such diseases may occur due to over nourishment.

सन्तर्पणजन्य रोगस्य चिकित्सा-

शस्तमुल्लेखनंतत्रविरेकोरक्तमोक्षणम् ।
व्यायामश्चोपवासश्चधूमाश्चस्वेदनानिच ॥
सक्षौद्रश्चाभयाप्राशः प्रायो रुक्षान्नसेवनम् ।
चूर्णप्रदेहायेचोक्ताः कण्डूकोठविनाशनाः ॥

(च.सू. 23/8-9)

Ullekhana (Vamana- emesis), Virechana (purgation), Raktamokshana (bloodletting), Vyayama (physical), Upavasa (fasting), Dhumapana (smoking), Svedana (fomentation), intake of Abhyaprasha with honey, Ruksha Ahara (intake of rough and dry food), application of Churna Pradeha indicated in Kandu, Kotha in 3rd

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chapter are recommended.

त्रिफलारग्वधं पाठां सप्तपर्णं सवत्सकम।
मुस्तं समदनं निम्बं जलेनोत्क्वथितं पिबेत।
तेन मेहाद्यो यान्ति नाशमभ्यस्यतो ध्रुवम।
मात्राकालप्रयुक्तेन संतर्पणसमुत्थिताः।
(च.सू. 23/10-11)

The usage of this Kashaya is beneficial in the diseases caused by Santarpanaiya Roga (over nutrition). Triphala Kashaya, Aragavadha, Patha, Saptaparna, Vatsaka, Musta, Madana and Nimba (neem) these should be decocted in water. Continuous intake of Kashaya (decoction) by considering the Matra (dose) and Kala (time) is providing good result in Santarpanaiya Roga (over nutrition).

मुस्तामारग्वधः पाठा त्रिफला देवदारु च।
श्वदंष्ट्रा खदिरो निम्बो हरिद्रे त्वक्च वत्सकात।
रसमेषां यथादोषं प्रातः प्रातः पिबन्नरः।
संतर्पणकृतैः स्नवैर्व्याधिभिः संप्रमुच्यते।
एभिश्चोद्वर्तनोद्धर्षस्नानयोगोपयोजितैः ।
त्वग्दोषाः प्रशमं यान्ति तथा स्नेहोपसंहितैः॥
(च.सू. 23/12-14)

Musta, Aragvadha, Patha, Triphala, Devadaru, Svadamstra, Khadira, Nimbi, Haridra and Daruhardra, Vatsakatvak by using the decoction of these drugs in early morning according Dosha one is relieved of all the diseases caused by Santarpaniya Roga (over nutrition). Same drugs with or without oil substances used in the form of Udvartana, Uddhagharshana and Snana cures skin diseases.

कुष्ठं गोमेदको हिङ्गु क्रौञ्चास्थि त्र्यूषणं वचा।
वृषकैले श्वदंष्ट्राच खराह्वा चाश्मभेदकः॥
तक्रेण दधिमण्डेन बदराम्लरसेन वा।
मूत्रकृच्छ्रं प्रमेहं च पीतमेतदव्यपोहति॥
(च.सू. 23/15-16)

Kustha, Gomedaka, Hingu, Krauncasthi, Tryushana, Vacha, Vrushak, Ela, Svadamshtra, Kharahva, Ashmabhedaka the powder of these drugs taken along with Takra (butter milk), Dadhi Manda (curd-water), Badaramla juice consumed. This will cure Mutrakruccha and Prameha.

तक्राभयाप्रयोगैश्च त्रिफलायास्तथैव च।
अरिष्टानां प्रयोगैश्च यान्तिमेहाद्यः शमम॥

By administration of Abhaya along with Takra, Triphala along with Takra and uses of Arishta is beneficial in Prameha.

त्र्यूषणं त्रिफला क्षौद्रं क्रिमिघ्नमजमोदकः।
मन्थोऽयं सक्तवस्तैलं हितो लोहोदकाप्लुतः॥

Tryushan, Triphala, Kshaudra, Krimighna, Ajamodaka are mixed with roasthed grain flour and Mantha is prepared adding some oil and decoction of Aguru, is beneficial in Meha.

व्योषं विडङ्गं शिग्रूणि त्रिफलां कटुरोहिणीम।
बृहत्यौ द्वे हरिद्रे द्वे पाठामतिविषां स्थिराम॥
हिङ्गु केबुकमूलानि यवानीधान्यचित्रकान।
सौवर्चलमजाजीं च हपुषां चेति चूर्णयेत॥
चूर्णतैलघृतक्षौद्रभागाः स्युर्मानतः समाः।
सक्तूना षोडशगुणो भागः संतर्पणं पिबेत॥
प्रयोगादस्य शाम्यन्ति रोगाः संतर्पणोत्थिताः।
प्रमेहा मूढवाताश्च कुष्ठान्यर्शांसि कामलाः॥
प्लिहा पाण्ड्वामयः शोफो मूत्रकृच्छ्रप्रोचकः।
हृद्रोगो राजयक्ष्मा च कासः श्वासो गलग्रहः॥
क्रिमयो ग्रहणीदोषाः श्वैत्र्यं स्थौल्यमतीव च।
नराणांदिप्यतेचाग्निः स्मृतिर्बुद्धिश्चवर्धते॥
व्यायामनित्योजीर्णाशीयवगोधूमभोजनः ।
सम्तर्पनकृतैर्दोषैः स्थौल्यं मुक्त्वा विमुच्यते॥
उक्तं संतर्पणोत्थामानपतर्पणमौषधम।
(च.सू. 23/15-25)

Vyosha, Vidanga, Shigru, Triphala, Katurohini, Bruhati Dvaya, Haridra Dvaya, Patha, Ativisha, Sthira, Hingu, Kebukamula, Yavani, Dhanya, Citraka, Sauvarcala, Ajaji, Hapusa, the powder prepared from drugs it taken along with quantity of Taila, Ghritha, Kshaudra added with sixteen times of Saktu (roasted barley). It is useful in the treatment of diseases like, Prameha, Mudhavata, Kustha, Arsha, Kamala, Pliha Roga (disease of spleen), Pandu, Sopha, Mutrakruccha, Rajayakshma, Hrudroga, Kasa, Swasa, Galagraha, Krimiroga, Grahani, Switra and Atisthoulya. It also increases Agni, Smriti, Buddhi, Vyayama Nitya (Habitual exercise), Jirnashi Yava Godhuma (intake of food like barley and wheat only after the digestion of previous meal). By Apatarpana Aushadha management using under nourishment

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for Santarpanottha Vyadhi are explained.

अपतर्पणजन्य रोग–

वक्ष्यन्ते सौषधक्षोधक्षोर्ध्वमतर्पणजा गदाः ॥
देहाग्निबलवर्णौजः शुक्रमांसपरिक्षयः ।
ज्वरः कासानुबन्धश्च पार्श्वशूलमरोचकः ॥
श्रोत्रदौर्बल्यमुन्मादः प्रलापो हृद्व्यथा ।
विण्मूत्रसंग्रहः शूलं जङ्घोरुत्रिकसंश्रयम ॥
पर्वास्थिसन्धिभेदश्च ये चान्ये वातजा गदाः ।
ऊर्ध्ववाताद्याः सर्वे जायन्ते तेऽएतर्पणात ॥

(च.सू. 23/26-29)

The diseases caused by under nutrition will describe along with their treatment. Loss of body reduced Agni, Bala, Varna, Ojas, Shukra, Mamsa etc. Person suffers from Jwara, Kasa, Parswashula, Arochaka, Shrotra Daurbalya (weakness in the power of hearing), Unmada, Pralapa, Hrudayatha, Vinmutra Sagraha (obstruction in excretion of urine and stool), Shula Jangha Uru Trika (pain in legs, thigh and calf). Parvasthi Sandhi Bheda (pain in body parts, bones, joints) and other disease due to vitiation of Vata, upward movement of Vata.

तेषांसंतर्पणतज्ज्ञैः पुनराख्यातमौषधम ।
यत्तदात्वेसमर्थस्वादभ्यासेवातदिष्यते ॥

(च.सू. 23/30)

The treatment of Apatarpana Roga is said to be Santarpana Chikitsa which should be administered in long run by Abhyasa (regular use).

अपतर्पणजन्य व्याधी चिकित्सा–

सद्यः क्षीणो हि सद्यो वै तर्पणनोपचीयते ।
नर्ते संतर्पणाभ्यासच्चिरक्षीणास्तु पुष्यति ॥
देहाग्निदोषभैषज्यमात्राकालानुवर्तिना ।
कार्यमत्वरमाणेन भेषजम् चिरदुर्बले ॥
हिता मांसरसास्तस्मै पयांसि च घृतानि च ।
स्नानानि वस्तयोऽभ्यङ्गास्तर्पणाश्च ये ॥

(च.सू. 23/31-33)

Sadyakshina (person who is suffering from fresh attack of emaciation) can soon be cured by the administration of Sadyatarpana (refreshing regimen). Chirakshina Rogi (suffering from chronic type of emaciation) would require Santarpana Abhyasa (habitual and long acting intake of nourishing therapy). Treatment should be administered slowly depending upon Deha (physical constitution), Agni, Dosha, Kala, Matra etc. for such patients Mamsa Rasa (meat-soup), Paya(milk), Ghrita (ghee), Snana (bath), Basti (enema), Abhyanga (massage) and Tarpanah Tarpana Mantha (thin gruel which is nourishment) are useful.

ज्वरकासप्रसक्तानां कृशानां मूत्रकृच्छिणाम ।
तृष्यता मूर्ध्ववातानां वक्ष्यते तर्पणा हिताः ॥
शर्करापिप्पलतैलिघृतक्षौद्रैः समांशकैः ।
सक्तुद्विगुणितो वृष्यस्तेषां मन्थः प्रशस्यते ॥

(च.सू. 23/34-35)

For these patients suffering from Jwara (fever), Kasa (cough), Krusha (emaciation), Mutra Kruccha (difficulty in micturation -dysuria), Trushna (thirst) and Urdwavata (upward movement of Vata) in these condition Santarpana (nourishment drinks) is useful. Santarpana Mantha contains Sharkara (sugar candy, Pippali (pepper longum), Taila (oil), Ghritha (ghee), Madhu (honey) all in equal quantity added with double the quantity of Saktu (roasted barley) useful for such conditions.

सक्तवो मदिरा क्षौद्रं शर्करा चेति तर्पणम ।
पिबेन्मारुतविण्मूत्रकफपित्तानुलोमनम ॥

(च.सू. 23/36)

These patients can take Tarpana (drinks) prepared of Barley (roasted barley), Madira (alcohol), Madhu (honey) and Sharkara (sugar) which help in elimination of Maruta(Vata), Vit (faeces), Mutra (urine), Kapha and Pitta.

फाणितं सक्तवः सर्पिर्दधिमण्डोऽम्ललाञ्जिकम ।
तर्पणं मूत्रकृच्छघ्नमुदावर्तहरं पिबेत ॥

(च.सू. 23/37)

Santarpana Mantha (nourishing drink) prepared of Phanita (a preparation of sugar candy), Saktu (roasted barley), Sarpi (ghee), Dadhi Manda (whey), Amla Kanjika (sour gruel or preparation) which cures Mutra Krucchra (dysuria - difficulty in micurition) and Udavarta (upward movement of Vata).

मन्थः खर्जूरमृद्विकावृक्षाम्लाम्लीकदाडिमैः ।
परुषकैः सामलकैर्युक्तोमद्यविकारनुत ॥

(च.सू. 23/38)

Manth prepared from Kharjura, Mrudvika, Vrukshamla, Amlika, Dadima, Parushaka and Amalaka is useful in Madya Vikara.

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स्वादुरम्लो जलकृतः सस्नेहो रूक्ष एव वा।
सद्यः संतर्पणो मन्थः स्थैर्यवर्णबलप्रदः॥
(च.सू. 23/39)

Manth (gruel) prepared from water by adding Swadu, Amla, like Dadima with or without Sneha refreshes immediately promotes Sthairya (steadiness), Varna (complexion) and Bala (strength).

Importance of Upavasa and Concept of Intermittent Fasting

Upavasa is an exercise of restraining all activities. The word Upavasa is widely applied for therapeutic fasting. However, practicing Upavasa includes many other abstaining measures. Upavasa is one of the spiritual therapies and a type of Langhana (that which produces lightness of the body) therapy. Upavasa is a religious and spiritual practice in many countries of South East Asia region. (Cha. Sa. Sutra Sthana 22/18) There are different type of Upavasa that may be compared with calorie restriction. It includes lowering 30-40 percent of usual calorie consumption, while maintaining all the necessary nutrients and vitamins to support life. That fasting and calorie restriction (CR) makes an organism's metabolic process more efficient, enhancing the organism's age, is a well-research ed subject.

Indication of Upavasa- Vami (vomiting), Atisara (Diarrhoea), Gaurav (heaviness), Hrudroga (heart-related disorder), Alasaka (delayed emptying of stomach or sluggish bowels), Jwara (Fever), Arochaka (anorexia), Kapha-Pitta Roga (disorders due to Kapha and Pitta predominance). (Cha.Sa. Sutra Sthana 22/20)

Contraindications of Upavasa-

1. Patients with disease from elevated Vata Dosha should abstain oneself from fasting and those who have unrestrained thirst and hunger, aged and children, pregnant lady and sick person should avoid fasting.
2. As stated by acharya Charak, pregnant woman with aggravated Vata who practice frequent fasting develop retardation of foetus. This underdevelopment stays for long without any other signs, known as 'Nagodara'. [Cha. Sa. Sharira Sthana 8/26].
3. Fasting is contraindicated in Vataja diseases, chronic diseases and fever, along with this, in people with anger, jealousy and psychological disorders. [Cha. Sa. Chikitsa Sthana 3/140]

Concept of intermittent fasting-- Intermittent fasting is any of various meal timing schedules that cycle between voluntary fasting (or reduced calorie intake) and non-fasting over a given period. Methods of intermittent fasting include alternate-day fasting, periodic fasting such as the 5:2 diet, and daily time-restricted eating (TRE). Intermittent fasting has been studied to find whether it can reduce the risk of diet-related diseases, such as metabolic syndrome. Intermittent fasting may help with obesity, insulin resistance, dyslipidemia, hypertension, and inflammation.

Syllabus- Benefits of Shadrasabhojana.

Learning objectives- Explain the benefits of Shadrasabhojana

Shadrasa Bhojanasya Mahatwam

रसाः स्वाद्वम्ललवणतिक्तोषणकषायकाः।
षड् द्रव्यमाश्रितास्ते च यथापूर्वबलावहाः॥
(अ.ह.सू. 1/14)

There are six types of Rasa present in substances Swadu, Amla, Lavana, Tikta, Katu, Kashya and their strength increases in order of precedence. Different Rasa always substances are used to increase or to decrease Dosha. Qualities always exist in these substances and on taking a substance its qualities are automatically inherited.

तत्त्रिविधंप्रवरावरमध्यविभागेन।
सप्तविधंतुरसैकैकत्येनसर्वरसोपयोगाच्च।
तत्रसर्वरसप्रवरआवर मेकरसंमध्यंतु प्रवरावरमध्यस्तं।
(च.वि. 1/20)

Satmya is three types, Pravara, Madhyama, Avara and seven types according to six Rasas individually and collectively. Among them use of

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all rasa is Pravara, use of only one Rasa is Avara and use of 2 to 5 Rasa is Madhyama.

सर्वरसाभ्यासोबलकराणां। (च.सू. 25/40)

Intake of all six Rasa is the best among strength enhancing factors. Even this has been mentioned in the context of order of intake of Rasa while taking meals.

अश्नीयाततन्मनीभूत्वापूर्वंतुमधुरंरसं ।
मध्येऽम्ललवणौपश्चात्कटुतिक्तकषायकम ॥
(भा.प्र.पू. 5)

One should consume food in following order, so that there is proper digestion of food. One should consume food with full concentration begin with Madhura, Amla and Lavana Rasa in the middle and Kashaya, Katu and Tikta at the end, to pacify physiologically aggravated Vata, Kapha, Pitta respectively.

Balanced Doshas: Ayurveda categorizes individuals into three main body types or Doshas: Vata, Pitta, and Kapha. Shadrasabhojana is thought to help balance these Doshas by including all six tastes in the meal. Balancing the Doshas is believed to promote overall health and well-being.

Improved Digestion: Including all six tastes in a meal can stimulate the digestive process and help maintain a healthy digestive system. The different tastes may enhance the secretion of digestive enzymes and support optimal digestion.

Syllabus- Importance of Ashta Aharavidhivisesha Ayatanani in present era.

Learning objectives- Enumerate and explain the importance of Ashtahara Vidhi Viseshaya-tanani in present era

Importance of Ashta Aharavidhivisesha Ayatanani in Present Era.

(Ref- Cha. Vi.1/21-23, A. S. Su.10/3-15)

Ahara may be Hitakara as well as Ahitakara. The Hitakara Ahara depends upon the variation in Matra (dose), Kala (time), Kriya (method of preparation), Bhumi (place), Deha (body), Vyadhi (disease) and Vaya (age) of an individual.

हिताहितानामाहारजातानालक्षणमनपवादमभिजानीमहेः हितसमाख्यातानामाहारुजातानामहितसमा-ख्यातानांच मात्रा काल क्रिया भूमि देह दोषपुरुषवस्थान्तरेषुविपरितकारित्वमुपलभामह इति।
(च.सू. 25/32)

Due to above reason Ayurveda classics have laid down some examination methods, rules, regulations, for taking diet, even though a man takes wholesome food, he should have be examine the following point to achieve the proper digestion, assimilation and nourishment to the body.

The Ahara Vidhi Viseshayatanana means the causative factors which are responsible for the wholesome and unwholesome effect of the food or of the methods for the diet intake.

For the maintaining health every person should consume only Hitakara Ahara.

Charakacharya explains total eight factors. Vagbhatacharya explain seven factors.

तत्र खल्विमान्यष्टावाहारविधिविशेषायतनानि भवन्ति; तद्यथा प्रकृति करण संयोग राशि देश कालोपयोगसंस्थापयोक्त्रष्टमानि। (च.वि. 1/21)

The eight factors determine the utility or otherwise of various types of food are,

1. Prakruti (nature of the food substance)
2. Karana (method of their processing)
3. Samyoga (combination)
4. Rashi (quantity)
5. Desha (habit)
6. Kala (time i.e. stage of the disease or the state of the individual)
7. Upayoga Samstha (rules governing the intake of food)
8. Upayokta (wholesomeness to the individual who takes it).

Prakruti/ Svabhava (Nature of the substance)

तत्रप्रकृतिरुच्यतेस्वभावो यः, स पुनराहारौषधद्रव्याणां स्वाभाविको गुर्वादिगुणयोगः, तद्यथा—माषमुद्गयोः शूकरौणयोश्च। (च.वि. 1/21(1)

Prakruti is Swabhava (nature). Prakruti indicates the nature of the substance, which is the natural existence of properties like Guru (heavy)

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etc. in substances used as food and drug such as e.g. Masha is Guru (heavy) and Mudga is Laghu (light) and meat of Sukara (pork) is Guru (heavy) and that of Ena (deer) is Laghu (light).

Karana/Samskara (processing of food substance)

करणं पुनः स्वाभाविकानां द्रव्याणामभिसंस्कारः। संस्कारो हि गुणान्तराधानमुच्यते। तेगुणास्तोयाग्नि सन्निकर्ष शौचमन्थनदेशकालवासनभावनादिभिः कालप्रकर्षभाजनादिभिश्चधीयन्ते॥ (च.वि. 1/21(2)

Karana means the processing of the substances. Processing results in the transformation of the inherent attributes of substances. These properties are infused by contact of Toya (water) and Agni (fire), Shaucha (cleansing), Manthana (churning), Desha (storing), Kala (maturing), Vasana (flavoring), Bhavana (impregnation), Kala Prakarsha (preservation in container, Bhajana (frying process) etc.

Samyoga (combination)

संयोगः पुनर्द्वयोबहूनांवाद्रव्याणांसंहतीभावः, स विशेषमारभते, यं पुनर्नैकैकशे द्रव्याण्यारभन्ते; तद्यथा– मधुसर्पिषोः मधुमत्स्यपयसांचसंयोगः। (च.वि. 1/21(3)

Samyoga is the combination of two or more substances. This results in the manifestation of specific attributes which cannot be manifested by individual substances. Example - combination of Madhu (honey) and Ghrita (ghee) and that of Madhu (honey), Matsya (fish) and Payasa (milk).

Rashi (quantity of food substance)

राशिस्तु सर्वग्रहपरिग्रहौ मात्रामात्रफलविनिश्चयार्थः। तत्र सर्वस्याहारस्य प्रमाणग्रहणमेह पिण्डेन सर्वग्रहः, परिग्रहः पुनः प्रमाणग्रहणमेकैकशयेनाहारद्रव्याणाम्। सर्वस्य हि ग्रहः सर्वग्रहः, सर्वतश्च ह्रहः परिग्रह उच्यते॥ (च.वि. 1/21(4)

Rashi is quantity of food substance to be taken. That determine the result of their administration in adequate and inadequate quantity. Two types of Rashi,

1. Sarvagraha- The quantity of food taken in entirely is Sarvagraha.
2. Parigraha. Quantity of each of its ingredients is Parigraha.

Quantity of all things involved is Sarvagraha and that of each and everything individually is Parigraha.

Desha (relates to the habitat)

देशः पुनः स्थानं, स द्रव्याणामुत्पत्तिप्रचारौ देशसात्म्यं चाचष्टे। (च.वि. 1/21(5)

Desha denotes place relating to growth as well as distribution of the substance and also the suitability in respect of place.

Kala (Time)

कालो हि नित्यगश्चावस्थिकश्चः तत्रावस्थिको विकारमपेक्षते, नित्यगस्तु ऋतुसात्म्यापेक्षः। (च.वि. 1/21(6)

Kala stands for both the form of day and night and the states of individual i.e condition of health and age. Nityaga (Daily) in the form of day, night and time to take food, Rutucharya etc. Conditional (Avasthika) according to diseases one should consume food which is conducive to the disease, age etc.

Upayoga Samstha (rules for dieting)

उपयोगसंस्था तूपयोगनियमः, स जीर्णलणापेक्षः। (च.वि. 1/21(7)

Upayoga Samstha denotes the rules for dieting. They are for the most part dependent on the symptoms of digestion.

Upayokta-(who consumes the food)

उपयोक्तापुनर्यस्तमाहारमुपयङ्क्तेयदायत्तओकसात्म्यम। इत्यष्टावाहारविधिविशेषायतनानि व्याख्यातानि भवन्ति। (च.वि. 1/21(8)

Upayokta is that who consumes the food. He is the one responsible for the habitual intake of things i.e. Okasatmya. Thus the eight factors which determine the utility or otherwise of various types of food are explained.

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Syllabus- Importance of Nitya Sevaniya Dravyas in the maintenance of health.

Learning objectives- Explain the importance of Nityasevaniyadravyas in the maintenance of health

Importance of Nitya Sevaniya Dravyas in the Maintenance of Health

An Ancient balanced diet consist food articles which are explained in Nityasevaneeyahara. The food articles which are advised to take daily will fulfill the body requirements. The food articles which have similar qualities of Nityasevaneeyahara can be taken regularly.

मात्राशीस्यात । आहारमात्रा पुनरग्निबलापेक्षिणी । यावद-ध्यशनमशितमनुपहत्य प्रकृतिं यथाकालं जरां गच्छति तावदस्य मात्राप्रमाणं वेदितव्यं भवति ॥ (च.सू. 5/3-4)

Ahara should be consumed in proper Quantity. It should always depend on the strength of Agni. The quantity of Ahara which doesn't disturb the Prakruti, normalcy of Dhatu and Dosha and which gets digested in proper time is regarded as proper Matra (Quantity).

तच्च नित्यं प्रयुञ्जीत स्वास्थ्यं येनानुवर्तते ।
अजातानां विकाराणामनुत्पत्तिकरं च यत् ॥
(च.सू. 5/13)

One should take food articles that which maintain the health and prevent the unborn diseases. Ideal health means positive and perfect health and not merely an absence of disease.

Nitya Sevaneeya Dravya

षष्टिकाढ्यालिमुद्गांश्च सैन्धवामलके यवान् ।
आन्तरीक्षं पयः सर्पिर्जाङ्गलं मधु चाभ्यसेत् ॥
(च.सू. 5/12)

Food which are hita to the body like Shali (Rice), Mudga (Green Gram), SaindhavaLavana (rock salt), Amalaki (Gross Berry), Yava (Barley), Antariksha Jala (Rain Water), Paya (Milk), Ghrita (Ghee), Jangala Mamsa (Meat) and Madhu (Honey). These foods consumed regularly for the maintenance of health and prevention of diseases.

1. Shashtika is a kind of rice which grows very quickly to maturity within sixty days (meaning of Shashtika) and is therefore light on digestion. It is rich in carbohydrates, potassium.
2. Shali is a variety of rice, sometimes translated as red rice. It is rich in carbohydrates.
3. Mudga is a pulse called green gram (may be including black gram) similar to lentils or dals which is light on digestion. It is rich in proteins, phosphorus, calcium, potassium.
4. Saindhava is called rock salt; it is powdery, light pink in color. Its composition is said to include more of potassium than of sodium. This salt is cooling unlike other types of salt.
5. Amalaki is a type of fruit indigenous to India. It is rejuvenative, antioxidant, pacifying to all Doshas but Pitta, especially. It is rich in vitamin C and calcium.
6. Yava (Barley) is also light, laxative, diuretic, and is especially useful for removing excess Kapha from the body. It is rich in carbohydrates, Vitamin B1, B2, phosphorus.
7. Antariksha Jala (Rain water) is the translation in the text but because of environmental pollution a better meaning would bepure water. It's interesting to note that the source of water determines its Doshic qualities. Well water is heavy while moving water is lighter. Hot water reduces Kapha and body weight while cold water increases kapha and body weight. It maintenance the fluid in the body and minerals.
8. Milk that comes fresh from cows is best among milks. It is more easily digested if brought to a boil then drank warm. Milk is light in digestion, nourishing the body and Tridoshas. It rich in fat, protein, vitamins and minerals.
9. Ghee is clarified butter and is best among oils for pacifying Pitta. It also pacifies Vata and because it increases the digestive fire and is digested easily it does not aggravate Kapha. Rich in fat.
10. Honey pacifies Kapha predominantly and Pitta secondarily. Honey must be raw, uncooked and never used in foods to be cooked. The lighter the color means the less sharpness in it.

शीलयेच्छालिगोधूमयवषष्टिकजाङ्गलम् ।
सुनिषण्णकजीवन्तीवास्तूपोदकसानूपम् ॥
पथ्यामलकमृद्वीकापटोलीमुद्गशर्कराः ।

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घृतदिव्योदक क्षीर क्षौद्रदाडिमसैन्धवम् ॥
(अ.सं.सू. 10/45)

Vagbhata lists the following as to be taken regularly: Shali (rice), Godhuma (wheat), Yava (barley), Shashtika (rice maturing in 60 days), Jangala (meat of animals of hot arid lands), Sunisannaka, Jivanti (tuberous plant), Balamulaka, Pathya (haritaki), Amalaka, Mridvika, Patoli, Mudga (green gram), Sharkara (sugar), Ghrita (ghee), Divyodaka (rain water), Ksheera (milk), Kshaudra (honey), Dadima and Saindhava Lavana (mineral salt) may be consumed regularly.

Syllabus- Properties (Guna& karmas) of Ahara Dravyas in the following Vargas with their nutritive value: Dhanyavarga - Shuka Dhanya (Cereals and Millets), Shami Dhanya (Pulses), Shaka and Haritavarga (Leafy and Non leafy vegetables), Kanda varga (roots and tubers), Phalavarga (Fruits), Taila varga (Fats and Oils), Ikshuvarga (Sugarcane Products) & Madyavarga (Alcoholic Beverages), Dugdhavarga (Milk and Milk products), Ahara Upayogi Varga (Spices & Condiments), Kritannavarga(Prepared Food), Mamsavarga (Meat types) and Jala Varga.

Learning objectives- Explain the properties (Guna& karmas) of Ahara dravyas in the following vargas with their nutritive value: Dhanyavarga - Shuka Dhanya (Cereals and Millets), Shami Dhanya (Pulses), Shaka and Haritavarga (Leafy and Non leafy vegatables), Kanda varga (roots and tubers), Phalavarga (Fruits), Taila varga (Fats and Oils), Ikshuvarga (Sugarcane Products) & Madyavarga(Alcoholic Beverages), Dugdhavarga (Milk and Milk products), Ahara Upayogi Varga (Spices & Condiments), Kritannavarga (Prepared Food), Mamsavarga (Meat types) and Jala Varga

Ahara Varga

परमतोवर्गसंग्रहेणाहरद्रव्याण्यनुव्याख्यास्यामः ॥
शूकधान्यशमीधान्यमांसशाकफलाश्रयान ।
वर्गानहरितमद्याम्बुगोरसेक्षुविकारकान ॥
दशद्वौचापरौवर्गौ कृतान्नाहारयोगिनाम् ।
रसवीर्यविपाकैश्चप्रभावैश्चप्रचक्ष्महे ॥
(च.सू. 27/6-7)

Categories of food substances, Shuka Dhanya, Sami Dhanya, Mamsa, Shaka, Phala, Harita, Madya, Ambu, Gorasa, Ikshu Vikara, Krutanna, Ahara Yogi Varga are described in respect of their Rasa, Virya, Vipaka and Prabhava.

Dhanyavarga (Cereals and millets)

Here Anna has been considered as food material in which all types of Dhanya, Mamsa, Shaka, are incorporated. Dhanya is of two types- Sukadhanya and Simbidhanya.

Among them Shukadhanya is primary food regimen because of its wide uses. Whereas Simbi Dhanya has been considered as accessory food material in daily regime. On the other hand Shukadhanya is much more potent as suitable dietary regime in comparison with Simbidhanya. So Shukadhanya has been described first.

Shukadhanya Varga (Grains and Cereals) (Ref. Cha.su.27/8-12 Bha. Pra. 6/1-2, Su. Su.46/4)

Shuka means outer covering of the grain. In this group or cereals have been included and many of them have these covering like different verities of rice. Hence this group of Dhanya is called Shukadhanya.

रक्तो महान सकलमस्तूनकः शकुनाहृतः ।
सारामुखो दीर्घशूको रोधशूकः सुगन्धिकः ॥
पुण्ड्रः पाण्डुः पुण्डरीकः प्रमोदो गौरसारिवौ ।
काञ्चनो महिषः शूको दूषकः कुसुमाण्डकः ॥
लाङ्गला लोहवालाख्याः कर्दमाः शीतभीरुकाः ।
पतङ्गास्तपनीयाश्च ये चान्ये शालयः शुभाः ॥
स्वादुपाकरसाः स्निग्धा वृष्या बद्धाल्पवर्चसः ।
कषायानुरसाः पथ्या लघवो मूत्रला हिमाः ॥
(अ.ह.सू. 6/1-4)

Shuka Dhanya Varga-types of rice-Rakta (red), Mahan (big sized rice), Kalama, Turnaka, Shakunahruta, Saaramukha, Deerghashuka (having long sharp spike at the ends), Sugandhika (having good smell), Rodhrashuka, Pundra, Pandu, Pundarika, Pramoda, Gaura (white rice), Sariva, Kanchana (golden colored rice), Mahisha, Shuka, Dushaka, Kusumandaka, Langala Lohavala, Kardama, Sheetabheeruka, Patanga, stapaneeya (bright red)-these varieties of rice are good for consumption.

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Shali Dhanya Varga /Shali Varga (Ref. Cha.Su. 27/8-12,Bha. Pra. 6/3-6, Su.Su. 46/4-10)

These rice types of Shuka Dhanya are Shita Virya (cold in potency) and Madhura Rasa (sweet in taste) as well as Madhura Vipaka(taste conversion after digestion).

Baddha Alpa Varchasaha (they do not formmuch faeces, they may cause constipation), Snigdha (impart oiliness to the body), Bruhmana (improve weight), Shukrala (increase semen production), Mutrala (diuretic) are the qualities of Shali Dhanya.

Rakta Shali (red variety of rice) is the best in all Shali Dhanya. It is Trushnaghna (relieves thirst), Trimalapaha (balances all the three Doshas). Rakta Shali is possessing Madhura Rasa and Madhura Vipaka but because of its Prabhava it causes Malabaddhata (constipation).

शूकजेष वरस्तत्र रक्तस्तृष्णाक्रिदोषहा ।
महांस्तमनु कलमस्तं चाप्यनु ततः परे ॥
(अ.ह.सू. 6/5)

रक्तशालिर्वरस्तेषां तृष्णाघ्नस्त्रिमलापहः ।
महांस्तस्यानु कलमस्तस्याप्यनु ततः परं ॥
(च.सू. 27/11)

Rakta Shali (Red variety of rice) is the best quality. It relieves thirst and balances all the three Doshas. Next best to it is Mahan (big sized rice) variety. Next to it is Kalama variety.

Yavaka, Haayana, Paamshuvashpa, Naishadha varieties of rice are Svadu, Ushna, Guru, Shleshmapittala, Snigdha, Amlapaka, aggravates Kapha and Pitta, Srushtamutrapureesha and they are bad in their reverse order means Pamshuvaspa from Naisadha, Hayanah from Pamsuvaspa and Yavaka from Hayana, are inferior in quality respectively.

Shashtika Shali

षष्टिका मधुराः शीता लघवो वद्धवर्चस ।
वातपित्तप्रशमनाः शालिभिः सदृशा गुणैः ।
(अ.ह.सू. 6/6)

षष्टिका प्रवरा तेषां लघ्वी स्निधा त्रिदोषजित ।
स्वाद्वी मृद्वी ग्राहिणी च बलदा ज्वरहारिणी ॥
(भा.प्र. 6/24-26)

शीत स्निग्धोऽगुरुः स्वादु स्त्रिदोषघ्नः स्थिरात्मकः ।
(च.सू. 27/13)

षष्टिकः प्रवरस्तेषां कषायानुरसो लघुः ।
मृदु स्निग्धस्त्रिदोषघ्नः स्थैर्यद्वलवर्धन ॥
(सु.सू. 46/10)

Shashtika shali - the paddy which matures in 60 days is best among all paddies. It is Snigdha, Grahi, Laghu, Svadu, Tridoshaghna, Sthira, Hima.

It is of two types - Gaura - white and Asita-gaura (blackish white).

Next inferior to Shashtika is Mahavrihi, next to that is Krishnavrihi and the others such as Jatu Mukha, Kukkutandaka, Lavaka, Paravataka, Sukara, Varaka, Uddalaka, Ujvala, Cina, Sarada, Dardura, Gandhana and Kuruvinda.

The other types of rice are - sweet in taste, sour at the end of digestion, increases Pitta and are hard to digest. It increases volume of urine and faeces, increases body heat and causes imbalance of Tridosha.

Truna Dhanya Varga - group of grains produced by grass like plants –

Kangu, Kodrava, Neevara, Shyamaka and other grains are cold in potency, easily digestible, increases Vata, Lekhana (scraping, sacrificing) and balance Kapha and Pitta.

Among the Truna Dhanya varga, Priyangu helps in fracture healing, nutritive, nourishes and is heavily digestible.

Koradusha is grahi (absorbent), coolant and anti-poisonous.

Yava (Barley)

रुक्षः शीतो गुरुः स्वादुः सरो विडवातकृद्यवः ।
वृष्यः स्थैर्यकरो मूत्रमेदः पित्तकफान जयेत ।
पीनसश्वासकासोऽरुस्तम्भकण्ठात्वगामयान ।
(अ.ह.सू. 6/13-14)

यवः कषायो मधुरः शीतलो लेखनो मृदुः ।
व्रणेषु तिलवत्पत्थो रुक्षो मेधाऽग्निवर्धनः ॥
(भा.प्र. 6/28)

रुक्षः शीतोऽगुरुः स्वादुर्बहुवातशकृद्यवः ।
स्थैर्यकृत सकषायश्च बल्यः श्लेष्मविकारानुत ॥
(च.सू. 27/19)

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यवः कषायो मधुरो हिमश्च कटुविपाके कफपित्तहारी।
व्रणेषु पथ्यस्तिएलवच्च नित्यं प्रबद्धमूत्रो बहुवातवर्चा॥
(सु.सू. 46/41)

Yava (barley) is Ruksha (dry), Sheeta (cold), Guru (Heavy to digest), Svadu (sweet), Sara (promotes bowel movements), Vid-Vata Kruta (it increases the bulk of faeces and causes flatus), Vrushya (aphrodisiac), Stairyakrut (steadiness). Useful in Mutrameda (urinary disorder), Pitta Kapha imbalance disorders, Peenasa, Shwasa, Kasa, Urusthamba (thigh stiffness), Kantaroga (diseases of throat), Twakroga (skin diseases).

Anuyava (small sized barley) is inferior in qualities to that of Yava. Venuyava (seeds of bamboo) is non- unctuous and hot in potency.

Godhuma (Wheat)

वृष्यः शीतो गुरुः स्निग्धो जीवनो वातपित्तहा॥
सन्धानकरो मधुरो गोधूमः स्थैर्यकृत्सरः।
(अ.ह.सू. 6/15)

गोधूमः सुमनोऽपि स्यात्त्रिविधः स च कीर्तितः।
महागोधूम इत्याख्यः पञ्चाददेशात्समागत॥
गोधूमो मधुरः शीतो वातपित्तहरो गुरुः।
कफशुक्रप्रदो वल्यः स्निग्ध सन्धानकृत्सर॥
जीवनो बृंहणो व्रण्यो व्रण्यो रुच्य स्थिरत्वकृत॥
(भा.प्र. 6/31-32)

सन्धानकृद्वातहरो गोधूमः स्वादुशीतलः।
जीवनो बृंहणो वृष्यः स्निग्धः स्थैर्यकरो गुरुः॥
(च.सू. 27/21)

Wheat is Vrushya (aphrodisiac), Sheeta (cold), Guru (heavy to digest), Snigdha (unctunous), Jivaniya (enlivening), Bruhaniya (nourishing), Sandhanakari (heals fractures and wounds), Vatapittahara, Kaphakara, Balya (improve strength), Madhura (sweet), Sthairyakrut (stabilzing), Sara (promotes bowel movements), Varnya (cpmplexion), Pathya (wholesome).

Nandimukhi variety of wheat is good for health. It is Sheeta, Kashaya, Madhura and Laghu.

Shimbidhanya / Vaidala varga-(group of legumes and pulses)

मुद्गाढकीमसूरादि शिम्बीधान्यं वियन्यकृत।
कषायं स्वादु संग्राहि कटुपाकं हिमं लघु॥
मेदः श्लेष्मास्त्रपित्तेषु हितं लेपोपसेकयोः।
(अ.ह.सू. 6/17)

Mudga (green gram), Adhaki (toor dal), Masura (lentil) and other varieties belong to the group called Shimbi Dhanya (those having pods/legumes). Vibandhakrut (cause constipation), Kashaya, Swadu, Grahi, Katu Vipaka, Sheeta, Laghu , mitigate fat, Kapha, Asra (blood) and Pitta, suited for use as external application and bathing the body parts etc.

वरोऽत्र मुद्गोऽल्पचलः, कलायस्त्वतिवातलः॥
रजमाषोऽनिलकरो रुक्षो बहुशकृदगुरुः॥
(अ.ह.सू. 6/18)

Among Shimbi Dhanya, Mudga (green gram) is best; it causes mild increase of Chala (vata).

Kalaya (round pea) causes Vata and dryness, produces more faeces and is hard to digest.

Rajamasha (big sized black gram) increases Vata, dry, heavy to digest and increases bulk of faeces.

Mudga (Green gram)

कषायमधुरो रूक्षः शीतः पाके कटुर्लघुः।
विशदः शोष्मपित्तघ्नो मुद्गः सूप्योत्तमो मतः॥
(च.सू. 27/23)

मुद्गो रूक्षो लघुर्ग्राही कफपित्तहरो हिमः।
स्वादुरल्पानिलो नेत्र्यो ज्वरघ्नो वनजस्तथा॥
(भा.प्र. 6/61-62)

Among all the Shami Dhanya (pulses), Mudga (green gram) is considered as the best. Mudga (green gram) is having Kashaya (astringent), Madhura Rasa (sweet), Ruksha (dry), Shita (cold), Katu Vipaka (undergoes pungent taste after digestion), Laghu (light to digest), Vishad (brings clarity to channels) and Shleshma Pittaghna (balances Kapha and Pitta).

Kulttha (Horse gram)

उष्णाः कुलत्थाः पाकेऽम्लाः शुक्राश्मश्वासपीनसान्।
कासार्शः कफवाताश्रं घ्नन्ति पित्तास्त्रदाः परम्॥
(अ.ह.सू. 6/19)

लघुर्विदाहा वीर्योष्णः श्वासकासकफानिलान।
हन्ति हिक्काश्मरीशुक्रदाहानाहान सपीनसान।
स्वेदसंग्राहको मेदोज्वरक्रिमिहरः सरः॥
(भा.प्र. 6/61-62)

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उष्णाः कषायाः पाकेऽम्लाः कफशुक्रानिलापहाः।
कुलत्थाग्रहिणः कासहिक्काश्वासार्शसां हिता॥
(च.सू. 27/26)

उष्णः कुलत्थो रसतः कषायः कटुविपाके कफ़मारुतघ्न।
शुक्राश्मरीगुल्मनिषूदनश्च सांग्राहिकः पीनसकासहन्ता॥
(सु.सू. 46/37)

Kulattha is Kashaya Rasa, Laghu, Ushna, Amlapaka. It cures seminal disorder, useful in urinary stones, Laxative, Shwasa, Krimihara, Peenasa, Kasa, Medohara, Jwarahara, Kapha-Vata diseases but it increases bleeding (Raktapitta).

Nishpava (flat bean)

निष्पावो मधुरो रूक्षो विपाकेऽम्लो गुरुः सरः।
कषायः स्तन्यपित्तास्रमूत्रवातविबन्धकृत्॥
विदाह्युष्णो विषश्लेष्मशोथहृच्छुक्रनाशनः। (भा.प्र.)
निष्पावो वातपित्तास्रस्तन्यमूत्रकरो गुरुः।
सरो विदाही दृक्शुक्रकफशोफविषापहः॥
(अ.हृ.सू.6/20)

It aggravates Vata, Pitta, bleeding disorders; it increases breast milk production and promotes urine formation. It is Guru, Sara, Vidahi (increases burning sensation). It is not good for eyes and semen quality. It decreases Kapha, inflammation and is useful in poisoning.

Masha (Black gram)

माषः स्निग्धो बलश्लेष्ममलपित्तकरः सरः।
गुरूष्णोऽनिलहा स्वादुः शुक्रवृद्धिविरेककृत।
(अ.हृ.सू. 6/21)

माषो गुरुर्भिन्नपुरिषमूत्रः स्निग्धोष्णवृष्यो मधुरोऽनिलघ्न।
संतर्पणः स्तन्यकरो विशेषाद्बलप्रदः शुक्राकफावहश्च॥
(सु.सू. 46/34)

वृष्यः परं वातहरः स्निग्धोष्णो मधुरो गुरुः।
बल्यो बहुमलः पुंस्त्वं माषः शीघ्रं ददाति च।
(च.सू. 27/24)

माषो गुरुः स्वादुपाकः स्निग्धो रुच्योऽनिलापहः।
स्त्रंसनस्तर्पणो बल्यः शुक्रलो बृंहणः परः।
भिन्नमूत्रमलः स्तन्यो मेदःपित्तकफप्रदः।
गुदकीलर्दितश्वासपक्षिशूलानि नाशयेत॥
(भा.प्र.)

Masha is Snigdha, Balya, increases Kapha and Pitta, Malakara, Sara, Guru, Ushna, Vatahara, Madhura, Shwasahara, Ardita, Arsha, Shulanashaka, Shukra Vruddhikara and Virekakruta.

Fruits of Kakandola and Atmagupta (Mucuna pruriens) are similar to black gram in qualities.

Tila (Sesame seed)

उष्णस्त्वच्यो हिमः स्पर्शे केश्यो बल्यस्तिलो गुरुः।
अल्पमूत्रः कटुः पाके मेधाऽग्निकफपित्तकृत॥
(अ.हृ.सू. 6/21)

तोलो विपाके मधुरो बलिष्ठः स्निग्धो व्रणे लेपन एव पथ्यः॥
(सु.सू. 46/39)

स्निग्धोष्णो मधुरस्तिक्तः कषायः कटुकस्तिल।
त्वच्यः केश्यश्च बल्यश्च वातघ्नः कफपित्तकृत॥
(च.सू. 27/30)

Tila is Ushna, Tvachya, Hima Sparsha, Keshya, Balya, Guru, Alpamutra, Katu Paka, Medhakruta, Agnikruta and increases Kapha and Pitta.

Masha (black gram) in the group of Simbija (legumes) and Yavaka (small barley) in the group of Sukaja (cereals) are inferior.

Adhaki

आढकी कफपित्तघ्नी वातला, कफवातनुत।
(च.सू. 27/33)

आढकी कफपित्तघ्नी नातिवातप्रकोपणी॥
(सु.सू. 46/31)

आढकी तुवरा रुक्षा मधुरा शीतला लघुः।
ग्राहिणी वातजननी वर्ण्या पित्तकफास्त्रजित॥
(भा.प्र. 6/44)

Adhaki alleviates the vitiation of Kapha and Pitta but aggravates Vata, Varnya (good for complexion), Laghu (easily digestible).

Fresh grains (just harvested) are Abhisyandi (causes excess exudation from tissue pores and block them by it), those old by one year are easily digestible.

Those which grow quickly, those which are removed of their husk, those that are properly fried are also easy to digest.

Kritannna Varga- (group of prepared foods)

मण्डपेयाविलेपीनामादितश्च [illegible] लाघवम्।
यथापूर्वं शिवस्तत्र मण्डो वालानुलोमनः॥

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तृड्ग्लानिदोषशेषघ्नः पाचनो धातुसाम्यकृत् ।
स्रोतोमार्दवकृत्स्वेदी सन्धुक्षयति चानलम् ॥
(अ.ह.सू. 6/26-27)

Manda, Peya, Vilepi and Odana are preparations of rice or other grains cooked in water.

Manda : The thin fluid resembling water, drained out immediately after boiling is known as Manda. Manda is the best in all preparations, Vatanulomana (movement of faeces and flatus), relieves Trishna (thirst) and Glani (exhaustion), Nidoshasheshaghna (it nullifies residual Doshas), Pachana (it help to digestion), Dhatusaamyakruta (restores the normalacy of the Dhatu), Srotomardava Kruta (causes softness of the channels), Sandhukshayati (used as diet after Panchakarma).

क्षत्तृष्णाग्लानिदौर्बल्यकुक्षिरोगज्वरापहा ।
मलानुलोमनी पथ्या पेया दीपनपाचनी ॥
(अ.ह.सू. 6/28)

Peya : Slightly thicker to Manda but still only liquid is Peya. Peya (more liquid, less solid) relieves Kshudha (hunger), Trishna (thirst), Glani (exhaustion), Daurbalya (debility), Kukshi Roga (diseases of the abdomen) and Jwara (fevers), Malanulomana (easy elimination of faeces), Pathya (good for all), Dipana (increase appetite) and Pachana (helps in digestion).

विलेपी ग्राहिणी हृद्या तृष्णाघ्नी दीपनी हिता ।
व्रणाक्षिरोगसंशुद्धदुर्बलस्नेहपायिनाम् ॥
(अ.ह.सू. 6/29)

Vilepi : The next stage with more of solid grain and less of fluid is called Vilepi. Vilepi (less liquid more solid) withholds discharge of fluids from the body, Hrudya (good for the heart), Trishnaghna (relieves thirst), Dipana (increase appetite), Hita (ideal for all), especially for those suffering from Vrana (ulcers), Akshi Roga (eye diseases), Samshudhda Durbala Snehapayi (those who have been administered Panchakarma purification therapies, who are weak and who have been given fats for drinking as part of Snehana therapy before Panchakarma).

सुधौतः प्रस्रुतः स्विन्नोऽत्यक्तोष्मा चौदनो लघुः ।
यश्चाग्रेयौषधक्वाथसाधितो भृष्टतण्डुलः ॥
विपरीतो गुरुः क्षीरमांसाद्यैर्यश्च साधितः।
(अ.ह.सू. 6/30-31)

Odana : The last stage which is solid without fluid portion is known as Odana. Odana (solid) prepared with grains which have been washed well, in which the entire water has evaporated and which is devoid of hot fumes is easy to digest; likewise that prepared along with addition of decoction of medicinal substances of hot potency or that prepared with fried grains are also easily digestible; the opposite of these that prepared with addition of Kshira (milk), Mamsa (mutton) etc. are hard to digest.

Manda is prepared by adding fourteen parts water, Vilepi by four parts, Yavagu by six pats and Odana by little amount of water in rice. After boiling the rice with fourteen parts of water the drained out liquid which resembles like water is known as Manda. After boling the rice or wheat with six parts water, slightly thicker than Manda but still liquid is known as Peya and when the liquid portion is less than Peya then it is called Yavagu. The next stage with more solid grain and less of fluid is called Vilepi. And last stage, after boiling the rice which is solid without fluid portion is known as Odana. Manda, Peya, Vilepi and Odana are more easily digestible in their preceding order of enumeration. Manda-easiest to digest. Odana-is comparatively harder to digest.

In this manner, the effects of the grain, kind of processing, admixtures, quantity and other aspects should all be determined.

Mamsa Rasa (meat soup)

बृंहणः प्रीणनो वृष्यश्चक्षुष्यो व्रणहा रसः।
(अ.ह.सू. 6/32)

Mamsa rasa is Brihmana, Preenana (gives satisfaction), Vrushya, Chakshushya, Vranaha (heals ulcers and wounds).

Mudga Yush (soup of green gram)

मौद्गस्तु पथ्यः संशुद्धव्रणकण्ठाक्षिरोगिणाम ।
(अ.ह.सू. 6/33)

Mudga Yush is good for health, for those who have undergone Panchakarma

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therapies and for those suffering from ulcers, diseases of the throat and eyes.

Kulattha Yush (horse gram soup)

वातानुलोमी कौलत्थो गुल्मतूनीप्रतूनिजित ।
(अ.ह.सू. 6/33)

Kulattha Yush (horse gram soup) is Vata-nulomi, Useful in Gulma (abdominal tumour), Tuni and Pratituni (pains of the groin region).

Tila Vikruti

तिलपिण्याकविकृतिः शुष्कशाके विरूढकम ।
शण्डाकीवटकं वृष्ये दोषलं गुरूपनं गुरु ॥
(अ.ह.सू. 6/34)

The fermented preparation from Tila (sesamum), Pinyaka (residue of sesamum after the oil is taken out), dried leafy vegetables, germinated grains, Shandaki Vataka (balls of fried rice dried in sun and then fried in oil) are not good for eyes, increase the Doshas, cause debility and are hard to digest.

Rasala

रसाला बृंहणी वृष्या स्निग्धा बल्या रुचिप्रदा ।
(अ.ह.सू. 6/34)

Rasala-curds churned and added with pepper powder and sugar- it causes body weight increase, it is aphrodisiac, unctuous, improves strength and improves taste.

Panaka Guna(vegetable / fruit juice)

श्रमक्षुत्तृद्क्लमहरं पानकं प्रीणनं गुरु ।
विष्टम्भि मूत्रलं हृद्यं यथाद्रव्यगुणं च तत ॥
(अ.ह.सू. 6/35)

Relieves exhaustion, hunger, thirst and fatigue, gives satisfaction. It is generally hard to digest, stays long in the stomach, diuretic and good to the heart. Its properties depend on material from which it is prepared.

Laja Guna (fried paddy)

लाजास्तृद्छर्द्यतीसारमेहमेदःकफच्छिदः ।
कासपित्तोपशमना दीपना लघवो हिमाः॥
(अ.ह.सू. 6/36)

Laja is prepared by frying paddy. Relieves thirst, vomiting, diarrhea, diabetes, obesity, mitigates Kapha, cough and Pitta, increases appetite, easy to digest and cold in potency.

Prithuka Guna

पृथुका गुरवो बल्याः कफविष्टम्भकारिणः ।
(अ.ह.सू. 6/37)

Prithuka (parboiled and flaked paddy) is hard to digest, strengthening increases Kapha and causes constipation. Prithuka is prepared by boiling paddy for short while and pounding it with pestle and mortar.

Dhana

धाना विष्टम्भिनी रूक्षा तर्पणी लेखनी गुरुः ॥
(अ.ह.सू. 6/38)

Dhana (fried barely and other grains) stays long in the stomach causing indigestion, is dry, satisfying, scarifying, and hard to digest. Dhana is made by frying barely which is soaked in water and Saktu is flour either raw or fried.

Saktu Guna (corn flour)

सक्तवो लघवः क्षुत्तृद्श्रमनेत्रामयव्रणान ॥
घ्नन्ति सन्तर्पणाः पानात्सद्य एव बलप्रदाः ।
नोदकान्तरितान्न द्विर्न निशायां न केवलान ॥
न भुक्त्वा न द्विजैश्छित्त्वा सक्तूनद्यान्न वा बहून ।
(अ.ह.सू. 6/38-39)

Corn flour is easy to digest, relieves hunger, thirst, fatigue, eye diseases and wounds, is nutritious and taken as a drink gives strength immediately.

Corn flour should not be eaten without drinking water in between.

Should not be consumed twice in a day, Should not be had at night.

Should not be taken solely.

Without other kinds of foods.

Should not be had after meals.

It should not be hard to chew and it should not have in excess quantity.

Many tasty eatables are prepared from the flour of rice and other cereals, horse gram, bengal gram

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and other legumes, with addition of spices, sour and fragrant substances, some of them are boiled in water, some are steamed, some are fried in oil etc, vegetables like onions, brinjals, etc. are also used in some preparations. These are usually consumed as side-dishes or snacks in between meals. However in view of their difficult digestibility, some warnings have been enumerated above.

Mamsa varga (group of meats)

Mruga Varga : Harina (antelope, fawn) Kuranga (type of deer), Arksa (white footed antelope) Gokarna (Deer antelop), Mrigamatrika (Red coloured hare like deer), Shasha (rabbit), Shambara (deer with branched horns), Charushka (gazelle) sarabha (eight footed animal) etc. are known as Mriga. Generally all mruga meat mitigates Pitta and Kapha slightly increases Vata, easy for digestion and increase the strength of the person.

Viskira varga (group of birds which scratch ground with legs to pick food)

Lava (bustard quail), Vartika (bush quail), Vartira (rain quail), Raktavartma (red eyed owl), Kukkubha (wild cock), Kapinjala (black partridge), Upachakra (small greek pheasant), Chakora (greek pheasant), Kurubahava, Vartaka (button quail), Vartika(bush quail), Tittiri (grey partridge), Krakara (black partridge), Sikhi (peacock), Tamracuda (domestic cock), Bakara (small creane), Gonarda (siberian crane), Girivartika (mountain quail), Sharapada (a kind of sparrow), Indrabha (hedge sparrow), Varata (goose) etc. belong to the group known as Viskira (birds which scratch the ground with their legs and picks up their food). Meat of these Varga Madhura Rasa, cold in potency, Kashaya, Katu after digestion, Balya, Vrushya, mitigates all the three Doshas, easy for digestion.

Pratuda- (group of birds which peck the food and eat)

Jivanijivaka (greek partridge), Datyuha (gallinule), Bhrunagahwa (shrike), Suka (parakeet), Sarika (mynah), Latva (wild sparrow), Kokila (cuckoo), Harita (grey peigon), Kapota (wood peigon), Chataka (house sparrow) etc. belong to the group of pratuda (birds which peck the food and eat). Meat of Pratuda is Madhura, Kashaya, cold in potency, mitigates Pitta and Kapha, easy for digestion, causes constipation and slight increase of Vata.

Bileshaya (group of creatures that live in burrows)

Bheka (frog), Godha (iguana lizard), Ahi, (snake), Swavid (hedgehog) etc. are Bileshaya (living in burrows). Meat of these animals mitigates Vata, Madhura rasa and after digestion Madhura Vipaka, Balya, hot in potency, with hold elimination of urine and feaces.

Prasaha Varga (living beings which catch food by teeth, tear and eat)

Go (cow), Khara (ass, donkey), Aswatara (mule), Ustra (camel), Ashwa (horse), Dwipi (leopard), Simha (lion), Aruksha (dear), Vanara (monkey), Marjala (cat), Musaka (rat, mice), Vyaghra (tiger), Vrka (jackal), Babhru (large brown mongoose Tarksu (hyena), Lopaka (fox, jambuka (jackal), Syena (hawk), Casa (blue joy), Vantada (dog), Vayasa (crow), Sasaghni (golden eagle), Bhasa (bread vulture), Kurara (osprey), Grdhra (vulture), uluka (owl), Kulingaka (sparrow hawk), Dhumika (owlet), Madhuha (honey buzzard), these and other animals and birds belong to the group known as Prasaha (which catch their food by the teeth, tear it and eat). Meat of Prasaha is hot in potency; it produces consumption, voracious appetite, insanity and loss of semen.

Mahamriga (big animals) - Varaha (boar), Mahisa (buffalo), Nyanku (dog deer), rohita (big deer), Ruru (swamp deer), Varana (elephant), Srmara (Indian wild boar), Chamara (yak), Khadga (rhinoceros) and Gavaya (goyal ox) are known as Mahamriga (animals of huge body). Meat of these animals mitigates Vata and Pitta, Vrushya, Balya, Madhura rasa, cold in potency, Snigdha, Mutrala and increases Kapha.

Apchara varga / Plava (aquatic birds)

Hamsa (swan), Sarasa (Indian crane), Kadamba

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(grey legged goose), Baka (heron), Karandava (white breasted goose), Palva (pelican), Balaka (crane), Utkrosa (mattard), Chakrahva (ruddy Sheldrake), Madgu (small cormorant), Krouncha (pound heron) etc. are known as Apcara (aquatic birds). Meat of Plava birds mitigates Pitta, Snigdha, Madura Rasa, Hard for digestion, cold in potency, Balya, Vrusha, increase strength.

Matsya varga (group of fish)

Rohita (red fish), Pathina (boal), Kurma (tortoise), Kumbhira (gavial, alligator), Karkata (crab), Sukti (pearl mussel), Sankha (conch shell), Urdu (otter), Sambuka (comman snail), Safari (large glistening fish), Varmi Candrika (a kind of cat fish) Chuluki (propoise, seahog) Pakra (crocodile), Makara (crocodile), Sisumara (dolphin), Timingala (whale , shark), Raji (snake fish), Cilicima (red striped fish) and others belongs to group of Matsya (fishes). Thus eight kinds of (source of) Mamsa (meat) are enumerated. Meat of Matsya is Snigdha, hot in potency, increases the Kapha and Pitta, mitigates Vata, Balya, Vrushya, and help taste, ideal for those who habituated to wine copulation and who have very keen digestive fire.

Goat and sheep are not included in any particular group because of their mixed heredity and living in all types of lands.

Out of the eight groups mentioned above, the first three (Mriga, Vishkira and Pratuda) are also known as Jangala (Vata dominant); the last three (Mahamriga, Jalacara and Matsya), are also called Anupa (Kapha dominant); the middle two (bilesaya and prasaha) are known as Sadharana (Tridosha balancing).

The region of land which has dry forests (shrubby) with less rainfall is Jangala, the region. This region is Vata dominant. Area with plenty of rainfall and water-logged is Anupa (Kapha dominant). The region which has neither too much of dryness nor too much of moisture is Sadharana (temperature). The nature and qualities of the land are also seen in all the flora and fauna of the region.

Aja (goat's meat)

नातिशीतगुरुस्निग्धं मांसमाजमदोषलम ।
शरीरधातुसामान्यादनभिष्यन्दि बृंहणम ।
(अ.ह.सू.6/64)

Goat meat is not very cold in potency, hard to digest, fatty, does not aggravate the doshas, being identical with the doshas of the human body, it is Anabhisyandi (does not cause increases of secretions in the tissue channels). It is nourishing, causes weight gain.

Avi (meat of sheep)

विपरीतमतो ज्ञेयमाविकं बृंहणं तु तत । (अ.ह.सू.6/64)

It is opposite in nature with that of goat and causes weight gain.

Heaviness and lightness of the flesh : Meat obtained from the parts above the umbilicus of male animals and from the parts below the umbilicus of female animals that obtained from the pregnant animal are all hard to digest. Among the quadrupeds, the flesh of females is easily digestible but among the birds it is of the males. Flesh obtained from the head, neck, thighs, back, waist, forelegs, stomach and intestines are hard to digest in the reverse order of enumeration. The tissues of the animals such as blood and others are hard to digest in their successive order, testicles, penis, kidneys, liver and rectum are hard to digest than the flesh.

Shaka Varga (group of leafy vegetables)

अथ शाकवर्गः।
शाकं पाठाशठीसूषासुनिषण्णसतीनजम ।
त्रिदोषघ्नं लघु ग्राहि सराजक्षववास्तुकम ॥
(अ.ह.सू. 6/72)

Patha, Shati, Susha, Sunishanna, Satinaja in general, mitigates all the three Doshas, are easily digestible and Grahi (absorbent); Sunishanna increases hunger and is aphrodisiac; Rajakshava is still better and cures duodenal diseases, hemorrhoids; Vastuka breaks up the hard faeces. Kakamachi mitigates the three Doshas, useful in skin diseases, is aphrodisiac, hot in potency, rejuvenator, causes easy movement of faeces, and is good for voice. Changeri is sour taste, kindles digestion, good for duodenal diseases, hemorrhoids

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and for increased Vata and Kapha; hot in potency, withholds elimination of fluids and is easily digestible.

Patola, Saptala, Arista (neem leaves), Sharngeshta (angaravalli/bharangi), Avalguja (Bakuchi), Amruta (Tinospora), Vetra (shoot of Vetra), Brhati (Solanum indicum), vasa (Adhatoda vasica), Kutill, Tilaparnika (badraka), Mandukaparni (Gotu kola), Karkota, Karavella (bitter gourd). Parpata, Nadikalaya, Gojihwa (Godhumi); Vartaka (Brhati), Vanatiktaka (Vatsaka/Kutaja), Karira, Kulaka (Kupila), Nandi (Jaya), Kucaila, Sakuladani (Mesasrngi), Katilla (raktapunarnava), Kebuka (kembuka), Kosataka, and Karkasa (Kampilla) all these are cold in potency, bitter in taste, pungent at the end of digestion, with hold the movement of fluids, increase Vata and mitigate Kapha and Pitta.

Patola

हृद्यं पटोलं कृमिनुत्स्वादुपाकं रुचिप्रदम।
(अ.ह.सू. 6/79)

Patola is good for the heart (or the mind), useful in worms, sweet at the end of digestion and gives taste.

Brihati

पित्तलं दीपनं भेदि वातघ्नं बृहतीद्वयम।
(अ.ह.सू. 6/79)

The two Brihatis (Brihati and Kantakari) increases Pitta, promote hunger, breaks the hard faeces.

Vrusha (Vasa)

वृषं तु वमिकासघ्नं रक्तपित्तहरं परम। (अ.ह.सू. 6/80)

Vasa cures vomiting, cough and especially so the hemorrhagic disease.

Karavella (bitter gourd)

कारवेल्लं सकटुकं दीपनं कफजित्परम। (अ.ह.सू. 6/80)

Karavella is better in taste, kindles digestion and mitigates Kapha and Pitta especially.

Vartaka (brinjal)

वार्ताकं कटु तिक्तोष्णं मधुरं कफवातजित।
सक्षारमग्निजननं हृद्यं रुच्यमपित्तलम।
(अ.ह.सू. 6/81)

It is pungent, bitter, hot in potency, sweet, mitigates Kapha and Vata, is slightly alkaline, kindles digestion improves taste and does not aggravate Pitta.

Tanduliya

तण्डुलीयो हिमो रूक्षः स्वादुपाकरसो लघुः।
मदपित्तविषास्रघ्नः। (अ.ह.सू. 6/84)

It is cold in potency, dry, sweet in taste and also at the end of digestion and easily digestible, cures intoxication, Pitta, poison and discovers of bold;

Palankya

गुर्वी सरा तु पालङ्क्या ...। (अ.ह.सू. 6/84)

It is hard to digest and laxative.

Upodika (spinach)

....मदघ्नी चाप्युपोदका। (अ.ह.सू. 6/84)

It relieves intoxication,

Chanchu

पालङ्क्यावत्स्मृतश्चञ्चुः स तु सङ्ग्रहणात्मकः।
(अ.ह.सू. 6/85)

It is similar to Palankya and withholds elimination of fluids.

Vidari

विदारी वातपित्तघ्नी मूत्रला स्वादुशीतला॥
जीवनी बृंहणी कण्ड्या गुर्वी वृष्या रसायनम।
(अ.ह.सू. 6/85)

It mitigates Vata and Pitta, is diuretic, sweet in taste and cold in potency, prolongs life (by giving strength), makes the body stout, good for the throat, hard to digest, aphrodisiac and rejuvenator.

Jivanti

चक्षुष्या सर्वदोषघ्नी जीवन्ती मधुरा हिमा।
(अ.ह.सू. 6/86)

It is good for the eyes, mitigates all the Doshas, sweet in taste and cold in potency.

Kusmanda (ash gourd), Tumba (alabu), Kalinga, Karkaru, Evaru, Tindisa, Trapusa, Cinaka, Cirbhata—all cause increase of Kapha and Vata, breaks the hard faeces, stays long without

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digestion inside the stomach, causes more secretion in the tissues, sweet in taste and at the end of digestion and not easily digestible.

Kusmanda (ash gourd)

वल्लीफलानां प्रवरं कूष्माण्डं वातपित्तजित ।
बस्तिशुद्धिकरं वृष्यम..... । (अ.ह.सू. 6/88)

It is best among the creepers, mitigates Vata and Pitta cleanses the urinary bladder, and aphrodisiac. Trapusa causes more urination (diuretic).

Sarsapa (mustard)

गुरूष्णं सार्षपं बद्धविण्मूत्रं सर्वदोषकृत ।
(अ.ह.सू. 6/101)

It is not easily digestible, hot in potency, binds the faeces and urine and causes increase of all the Doshas.

Mulaka (radish)

यद्वालमव्यक्तरसं किञ्चित्क्षारं सतिक्तकम ।
तन्मूलकं दोषहरं लघु सोष्णं नियच्छति ॥
गुल्मकासक्षयश्वासव्रणनेत्रगलामयान ।
स्वराग्निसादोदावर्तपीनसांश्च ।
(अ.ह.सू. 6/102-103)

When tender and not having definite taste, is slightly alkaline and better, mitigates the Doshas, easily digestible hot in potency, and cures abdominal tumors, cough, asthma, ulcers, disease of the eye and throat, hoarseness of voice, asthma, upward movement inside the abdomen (reverse peristalsis) and chronic nasal catarrh. Radish that is tender, and not having definite taste, is slightly alkaline and bitter, balances Doshas, easy to digest, hot in potency and cures abdominal tumors, cough, respiratory conditions, ulcers, diseases of eye and throat, hoarseness of voice, bloating, and rhinitis.

महत्पुनःरसे पाके च कटुकमुष्णवीर्यं त्रिदोषकृत ।
गुर्वभिष्यन्दि च । (अ.ह.सू. 6/103)

Radish, big in size is hard to digest, pungent in taste and at the end of digestion, not in potency, increases all the three Doshas, hard to digest and is Abhishynadi (indigestion plus sticky to the gut).

Pindalu

कदूष्णो वातकफहा पिण्डालुः पित्तवर्धनः ।
(अ.ह.सू. 6/105)

It is pungent, hot in potency, mitigates Vata and Kapha but increase pitta.

Kuthera, Sigru (drum stick), Surasa, Sumuka, Asuri, Bhutrna, Phanijjia, Arjaka, Jambira, etc, when green are water absorbent, cause burning sensation during digestion, pungent, cause dryness, hot in potency, good for the heart (or the mind), kindles hunger and taste, destroy vision, semen and worms (intestinal parasites), penetrates deep, cause slight increase of the Doshas and are easily digestible.

Surasa (Tulasi- Holy Basil)

हिध्माकासविषश्वासपार्श्वरुक्पूतिगन्धहा ।
सुरसः.....। (अ.ह.सू. 6/108)

It cures hiccup, cough, poison, asthma, pain in the flanks and bad breath.

Lashuna (Garlic)

लशुनो मृशतीक्ष्णोष्णः कटुपाकरसः सरः।
हृद्यः केश्यो गुरुर्वृष्यः स्निग्धो रोचनदीपनः ॥
भग्नसन्धानकृद्बल्यो रक्तपित्तप्रदूषणः ।
किलासकुष्ठगुल्मार्शोमेहक्रिमिकफानिलान ॥
सहिध्मापीनसश्वासकासान् हन्ति रसायनम ।
(अ.ह.सू. 6/109-111)

It is highly penetrating (deep into the tissues), hot in potency, pungent in taste, and at the end of digestion, makes the bowels to move, good for the heart (or the mind), and hairs; hard to digest, aphrodisiac, unctuous, improves taste and digestion, helps union of features, gives strength, greatly vitiates the blood and Pitta, cures leucoderma, skin diseases, abdominal tumors, hemorrhoids, diabetes, worms, diseases caused by Kapha and Vata, hiccup, chronic nasal catarrh, asthma and cough. It is a rejuvenator of the body.

Palandu (Onion)

पलाण्डुस्तद्गुणन्यूनः श्लेष्मलो नातिपित्तलः ।
(अ.ह.सू. 6/112)

It is inferior in the above qualities, increases of Pitta.

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Grinjanaka (carrot)

कफवातार्शसां पथ्यः स्वेदेऽभ्यवहतौ तथा।
तीक्ष्णो गृञ्जनको ग्राही पित्तिनां हितकृन्न सः।
(अ.ह.सू. 6/113)

It is best suitable to persons suffering from hemorrhoids of Kapha Vata origin, for fomenting (the pile masses) and eating; it is penetrating, water absorbent and not suitable to those who have pitta predominance.

Harita Varga (non leafy vegetables) : Plants are used in salad from.

Adraka (Green ginger) is appetizer, digestive, stimulant and Vrushya. Its juice is prescribed in diseases due to the vitiation of Vata and Kapha. It also cures constipation.

Jambira (citrus medica) is appetiser, digestive stimulant, Tikshna, Sugandhi, mouth cleanser, alleviator of Kapha as well as Vata and anti infective. It helps digestion of food.

Dhanyaka (coriandrum sativum), Ajagandha are appetizer and fragrant. They are not very pungent. They also do not provoke Doshas.

Phala Varga (group of fruits)

Draksha (grapes) is best among fruits, is aphrodisiac, good for the eyes, helps elimination of urine and faeces, sweet in taste and the end of digestion, unctuous, slightly astringent, cold potency, hard to digest, cures diseases of Vata, Pitta and Rakta; better taste in the mouth, intoxication, thirst, cough, fever, respiratory conditions, hoarseness, injury to the lungs and chronic respiratory diseases.

Dadima (Pomegranate)

वद्रिक्तपित्ताञ्जयति त्रीन्दोषान्स्वादु दाडिमम।
पित्ताविरोधि नात्युष्णमम्लं वातकफापहम॥
सर्वं हृद्यं लघु स्निग्धं ग्राहि रोचनदीपनम।
(अ.ह.सू. 6/117-118)

It mitigates the greatly increased Pitta in particular and the other doss also and is sweet; the sour variety is also not going to increase Pitta, not very hot in potency and mitigates Vata and Kapha. All varieties of Pomegranate are good to the heart, easily digestible unctuous, without elimination of fluids, stimulate appetite and digestion.

Mocha (plantain), Kharjura (dates) Panasa (jack fruits) Narikela (cocoanut) parusaka Amrataka , Tala, Kasmarya, Rajadana, Madhuka, Badara, Ankola, Phalgu, Slesmataka, Vatama, Abhisuka, Aksoda, Mukulaka, Nikocaka, Urumanam, and Priyala make the body stout, not easily digestible cold in potency, relive burning sensation , injury to the lungs, consumption, bleeding conditions, sweet in taste and also at the end of digestion, unctuous, stay long in the stomach without digestion, increase Kapha and semen.

Fruit of Tala (Borassus flabellifera)

फलं तु पित्तलं तालं सरं काश्मर्यजं हिमम॥
शकृन्मूत्रविबन्धघ्नं केश्यं मेध्यं रसायनम।
(अ.ह.सू. 6/122)

It increases Pitta, moves the bowels. A fruit of Kasmarya is cold in potency, relives the obstruction of faeces and urine, good for the hairs, increases intelligence and is a rejuvenator.

Bilvaphala (bael fruit)

पक्वं सुदुर्जरं बिल्वं दोषलं पूतिमारुतम।
दीपनं कफवातघ्नं बालं, ग्राह्युभयं च तत॥
(अ.ह.सू. 6/125)

When ripe is hard to digest, aggravates the Doshas and causes flatus; unripe fruit kindles digestion, mitigates Vata and Kapha; both are water absorbent.

Amakapittha (unripe Kapittha)

कपित्थमामं कण्ठघ्नं दोषलं, दोषघाति तु।
पक्वं हिध्मावमथुजित, सर्वं ग्राहि विषापहम॥
(अ.ह.सू. 6/126)

It is bad to the throat, and increases the three Doshas. Ripe fruit mitigates the Doshas, relives hiccup ad vomiting, both are water absorbent and anti-poisonous.

Jambava (Jamun fruit)

जाम्बवं गुरु विष्टम्भि शीतलं भृशवातलम।
सङ्ग्राहि मूत्रशकृतोरकण्ठ्यं कफपित्तजित॥
(अ.ह.सू. 6/127)

click here -} dhruvataare

It is not easily digestible, stays long inside the stomach, cold in potency, causes aggravation of Vata especially, absorbs moisture from urine and faeces, bad for throat and mitigates Kapha and Pitta.

Bala Amra (tender unripe mango)

वातपित्तास्रकृद्बालं, बद्धास्थि कफपित्तकृत।
गुर्वाम्लं वातजित्पक्वं स्वाद्वम्लं कफशुक्रकृत॥
(अ.ह.सू. 6/128)

It increases Vata, Rakta (blood) and Pitta; when its seed is fully formed, it increases Kapha and Pitta; when it is ripe it is not easily digestible, mitigates Vata, and increases Kapha and semen.

Vruksamla (Garcinia fruits)

वृक्षाम्लं ग्राहि रूक्षोष्णं वातश्लेष्महरं लघु।
(अ.ह.सू. 6/129)

It is absorbent, dry, hot in potency, mitigates Vata and Kapha and easily digestible.

Samya (fruit of Sami)

शम्या गुरूष्णं केशघ्नं रूक्षम। (अ.ह.सू. 6/129)

Itis not easily digestible, hot in potency, destroys the hairs and causes dryness.

Pilu

पीलु तु पित्तलम। कफवातहरं भेदि प्लीहार्शःकृमिगुल्मनुत।
सतिक्तं स्वादु यत्पीलु वात्युष्णं तत्त्रिदोषजित॥
(अ.ह.सू. 6/130)

It increases Pitta, mitigates Kapha and Vata, is purgative, cures diseases of the spleen, haemorrhoids, worms, abdominal tumors; that variety of Pilu which has bitter- sweet taste is not very hot in potency and mitigates all three Doshas.

Matulunga (bigger variety of lemon fruit)

त्वक्तिक्तकटुका स्निग्धा मातुलुङ्गस्य वातजित।
बृंहणं मधुरं मांसं वातपित्तहरं गुरु।
लघु तत्केसरं कासश्वासहिध्मामदात्ययान॥
आस्यशोषानिलश्लेष्मविबन्धच्छर्दरोचकान।
गुल्मोदरार्शःशूलानि मन्दाग्नित्वं च नाशयेत।
(अ.ह.सू. 6/131-132)

It is better, pungent and unctous, mitigates Vata; its fleshy part makes the body stout, is sweet in taste, mitigates Vata and Pitta and not easily digestible its tendril is easily digestible cures cough, asthma, hiccup, alcoholic intoxication dryness of the mouth, disorders of Vata and Kapha, constipation, vomiting, loss of taste, abdominal tumor, enlargement of the abdomen, haemorrhoids, colic and dyspepsia.

द्राक्षापरूषकं चार्द्रममृं, पित्तकफप्रदम।
गुरूष्णवीर्यं वातघ्नं सरं सकरमर्दकम॥
(अ.ह.सू. 6/136-137)

Draksa (grapes) and Parusaka and Karamardaka, in their green state are sour, increase Pitta and Kapha, hard to digest, hot in potency, and mitigate Vata and laxative. Fruits of Amlika and Kola improve digestion, cause purgation, cures thirst, fatigue, and exhaustion; are easily digestible and mitigates Kapha and Vata.

Lakuca phala is least among all the fruits and increases all the above the Doshas.

Ausadha varga (group of medicinal herbs)

Lavan (Salts)

विष्यन्दि लवणं सर्वं सूक्ष्मं सृष्टमलं मृदु।
वातघ्नं पाकि तीक्ष्णोष्णं रोचनं कफपित्तकृत।
(अ.ह.सू. 6/143)

All types of salts are Vishyandi (produce more secretions in the tissues) Suksma (enter into minute pores) help soft/easy movement of faeces, mitigate Vata, help digestion, are penetrating, aggravate Kapha and Pitta.

Saindhava Lavana (rock salt)

सैन्धवं तत्र सस्वादु वृष्यं हृदयं त्रिदोषनुत।
लघ्वनुष्णं दृशः पथ्यमविदाह्यग्निदीपनम।
(अ.ह.सू. 6/144)

It is slightly sweet, aphrodisiac, good for the heart (or mind), mitigates all the three Doshas, easily digestible not hot in potency, good for health, does not cause burning digestion and kindles digestion.

Sauvarcala (sochal salt)

लघु सौवर्चलं हृद्यं सुगन्ध्युद्गारशोधनम।
कटुपाकं विबन्धघ्नं दीपनीयं रुचिप्रदम।
(अ.ह.सू. 6/145)

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It is easily digestible good for the heart (or mind), possesses good smell, purifies belching, pungent at the end of digestion, relives constipation, kindles digestion and gives taste.

Bida Lavana

ऊर्ध्वाधःकफवातानुलोमनं दीपनं विडम ।
विबन्धानाहविष्टम्भशूलगौरवनाशनम ।

(अ.ह.सू. 6/145)

It produces both upward and downward movement of Kapha and Vata, kindles digestion, cures constipation, flatulence, obstruction, of flatus, colic and heaviness (of the abdomen).

Samudra Lavana

विपाके स्वादु सामुद्रं गुरु श्लेष्मविवर्धनम ।

(अ.ह.सू. 6/147)

It is sweet at the end of digestion, not easily digestible and aggravates Kapha.

Aubdhida Lavana

सतिक्तकटुकक्षारं तीक्ष्णमुत्क्लेदि चौद्भिदम ।

(अ.ह.सू. 6/148)

It is slightly bitter, pungent and alkaline in taste, penetrates deep and increases the secretions.

Krisna lavana (black salt) has properties similar to Souvarcala except the smell.

Romaka is easily digestible; Pamsuttha is slightly alkaline, aggravates Kapha and not easily digestible.

Whenever Lavanas (salt) are to be used (for medicinal recipes) they should be prepared commencing with Saindhava.

Yavakshara

गुल्महृद्ग्रहणीपाण्डुप्लीहानाहगलामयान ।
श्वासार्शःकफकासांश्च शमयेद्यवशूकजः ।

(अ.ह.सू. 6/150)

It mitigates abdominal tumors, diseases of the heart, duodenal disease, anemia, splenic disorders, distension of the abdomen, diseases of the throat, asthma, hemorrhoids and cough arising from Kapha.

Kshara Guna – All Ksharas are very

Teekshna – penetrating

Ushna – very hot in potency

Krumijit – destroy worms

Laghu – easily digestible

Pitta Asruk dushana – vitiate Pitta and blood

Paki – helps in digestion, causes healing of wounds

Chedya – help break up hard masses,

Ahrudya not good for the heart, punctures the tissues; being pungent and salty in taste are not good to semen, Ojus (essence of the tissues), hairs and eye (vision).

Hingu (asa foetida)

हिङ्गु वातकफानाहशूलघ्नं पित्तकोपनम ।
कटुपाकरसं रुच्यं दीपनं पाचनं लघु ॥

(अ.ह.सू. 6/152)

It mitigates Vata, Kapha, cues distension of the abdomen and colic, aggravates Pitta, pungent in taste and at the end of digestion, enhances taste, hunger, digestion and is easily digestible.

Haritaki (A. Hru. Su. 6/153-157)- Haritaki is astringent, sweet at the end of digestion, dry (causes dryness) devoid of Lavana Rasa (possesses the remaining five tastes) easily digestible, kindles hunger, helps digestion, improves intelligence, best to maintain youth, hot in potency, laxative, bestows long life, strengthens the mind and the sense organs, cures leprosy (and other skin diseases) discoloration, disorders of voice, chronic intermittent fevers, diseases of the head, and eyes, anaemia, heart disease, jaundice, disease of the duodenum, consumption, dropsy, diarrhea, obesity, fainting, vomiting, worms (intestinal parasites), dyspnoea, cough, excess salivation, hemorrhoids, disease of the spleen, distension of the abdomen, enlargement of the abdomen, obstruction of channels, abdominal tumors, stiffness of the thing, loss of taste (anorexia and many other disease arising from (aggravation of) Kapha and Vata.

Amalaki (A. Hr. Su. 6/158)- Similarly so is Amalaka in all other properties it is cold in potency, and mitigates Pitta and Kapha. Aksha (Vibhitaka) is pungent at the end of digestion, cold in potency, good for hairs and possesses properties similar (to Haritaki and Amalaka) but slightly less (in degree).

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Triphala (Haritaki, Amalaki and Vibhitaki)

त्रिफलाऽक्ष्यामयापहा ।
इयं रसायनवरा त्वग्गदक्लेदमेदोमेहकफास्रजित् ॥
रोपणी (अ.हृ.सू. 6/159)

Together is a best rejuvenator of the body, cures diseases of the eyes, heals wounds and cures skin diseases, excess moisture of the tissues, obesity, diabetes, aggravation of Kapha and Asra (blood).

Kanda varga (roots and tubers)

All type of Kanda cure bleeding disease are cold in potency, swet in taste, hard for digestion, increases semen greatly and augment breast milk.

Vidari Kanda- It is sweet, stoutening, aphrodisiac, cold in potency, good for voice, increases urine greatly, strengthen and mitigates Pitta and Vata.

Satavari Kanda- It mitigates Vata and Pitta, is aphrodisiac, sweet and bitter in taste; the bigger kind is good for heart, increases intelligence, digestive power and strength. Varaha Kanda- It mitigates Kapha, diabetes, leprosy, and worms, bestows strength, aphrodisiac and rejuvenator.

Taila Varga, Taila Guna (qualities of oil)

तैलं स्वयोनिवत्तत्र मुख्यं तीक्ष्णं व्यवायि च ।
त्वग्दोषकृदचक्षुष्यं सूक्ष्मोष्णं कफकृन्न च ॥
कृशानां वृंहणायाल स्थूलानां कर्शनाय च ।
वद्धविट्कं कृमिघ्नं च संस्कारात्सर्वरोगजित् ॥
(अ.हृ.सू. 5/55-56)

Oils are generally similar to their source (oil seed). Sesame oil is the most important among all oils. Tila Taila (sesame oil) is Tvak Doshanut (cleanses and detoxifies skin), Chakshushya (good for eyes), Sukshma (pierces into deep tissues), Ushna (hot), balances Kapha, useful for both Sthula (obese) and Krusha (emaciated) people. Useful to relieve Badhda Vit (constipation) and Krimighna (worm infestation). When it is processed with other herbs, it is very beneficial in various diseases.

Eranda Taila Guna, Rakta Eranda Taila Guna (Castor oil benefits)

सतित्क्तोषणमैरण्डं तैलं स्यादु सरं गुरु ।
वर्ध्मगुल्मानिलकफानुदरं विषमज्वरम् ॥
रुक्शोफौ च कटीगुह्यकोष्ठपृष्ठाश्रयौ जयेत् ।
तीक्ष्णोष्णं पिच्छिलं विस्रं, रक्तैरण्डोद्भवं त्विति ॥
(अ.हृ.सू. 5/57-58)

Castor oil consists Tikta, Katu and Madhura Rasa; and Sara (laxative) and Guru (hard to digest) Guna. Useful in Vardhma (enlargement of the scrotum -hernia), Gulma (abdominal tumours), Anila Kaphahara (diseases caused by Vata and Kapha), Udara (ascitis), Vishama Jwara (intermittent fevers), Ruk (pain) and Shopha Kati Gruha Kostha Prushtha (swellings of the waist, genitals, abdomen and back), Tikshna (is capable of penetrating deep), Ushna (hot in potency) and Picchila (sticky) and Vistra (putrefied smell). Rakta Eranda Taila (oil of red variety of castor seeds) is still more Tikshna (penetrating), Ushna (hot in potency) and Picchila (sticky) and Vistra (putrefied smell).

Sarshapa Taila (Mustard oil)

कटूष्णं सार्षपं तीक्ष्णं कफशुक्रानिलापहम् ।
लघु पित्तास्त्रकृत् कोड्डकुष्ठार्शोव्रणजन्तुजित् ॥
(अ.हृ.सू. 5/59)

Sarshapa Taila (mustard oil) is having Katu Rasa and contains Tikshna (penetrating), Laghu (easy for digestion) Guna and Ushna Virya (hot in potency). It mitigates Vata and Kapha Dosha and decreases Sukra Dhatu in the body. It is useful to relieve Kotha, Kustha, Arsha, Vrana, Krimiroga and causes Raktapitta.

Aksha Taila Guna (Oil of Vibhitaka)

आक्षं स्वादु हिमं केश्यं गुरु पित्तानिलापहम् ।
(अ.हृ.सू. 5/60)

Vibhitaka Taila is having Madhura Rasa (sweet in taste), Hima (Shita- cold) and Guru (hard to digest) Guna, Keshya (good for hair), mitigate Pitta and Vata.

Nimba Taila Guna

नात्युष्णं निम्बजं तिक्तं कृमिकुष्ठकफप्रणुत् ॥
(अ.हृ.सू. 5/60)

Neem Taila is not very hot (slightly hot) in potency, Tikta (bitter), Krimi (anti-microbial), Kustha (useful in skin diseases) and mitigates Kapha.

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Uma (linseeds) and Kusumbha (safflower) Taila Guna

उमाकुसुम्भज चोष्णं त्वग्दोषकफपित्तकृत्।

Taila of Uma (linseed) and Kusumbha are Ushna (hot in potency), produce diseases of the Twaka (skin) and aggravate Kapha and Pitta.

Vasa Majja Medo Guna

वसा मज्जा च वातघ्नौ बलपित्तकफप्रदौ॥
मांसानुगस्वरूपौ च विद्यान्मेदोऽपि तादृशम्।
(अ.ह.सू. 5/61)

Vasa (muscle-fat) and Majja (bone-marrow) and Meda (fat) mitigate Vata, cause increase of Bala (strength), Pitta and Kapha and similar in properties with the meat of animals from which they are obtained. Thus concludes the discussion on the Taila Varga.

Ikshu Varga, Ikshu Rasa Guna

इक्षोः सरो गुरुः स्निग्धो बृंहणः कफमूत्रकृत्॥
वृष्यः शीतोऽस्रपित्तघ्नः स्वादुपाकरसो रसः।
(अ.ह.सू. 5/42)

Ikshu Rasa Guna- Ikshu Rasa (juice of sugar cane) is Sara (laxative), Guru (heavy to digestion), Snigdha (unctuous), Brihmana (nutritive, improves weight), Kaphakrut (increases Kapha), Mutrakrut (increases urine volume), Vrushya (aphrodisiac), Shita (coolant), Asrapittaghna (useful in bleeding disorders) and Swadu Rasa and Madhura Vipaka (sweet in taste).

Ikshu Bheda

Paundraka, Bhiruka, Vamsaka, sataporaka, Kantara, Tapaseksu, Kandekshu, Suchipatraka, Naipala, Dirgapatra, Nilapora, Kosakruta, Manogupta- these are different kind of Ikshu.

Yantrika Ikshu Rasa Guna

सोऽग्रे सलवणो, दन्तपीडितः शर्करासमः।
मूलाग्रजन्तुजग्धादिपीडनान्मलसङ्करात्।
किञ्चित्कालं विधृत्या च विकृतिं याति यान्त्रिकः॥
विदाही गुरुविष्टम्भी तेनासौ.....
(अ.ह.सू. 5/43-44)

The tip of shoots of sugarcane has Salavana (salt taste). If the root, shoots and worm infested parts of the cane are crushed together, the juice gets mixed with dirty material. It leads to Vidahi (burning sensation), Guru (indigestion) and Vishtambhi (constipation).

Poundrika, Vamshika Ikshu Guna

.....तत्र पौण्ड्रकः।
शैत्यप्रसादमाधुर्यैर्वरस्तमनु वांशिकः॥
शतपर्वककान्तारनैपालाद्यास्ततः क्रमात्।
सक्षाराः सकषायाश्च सोष्णाः किञ्चिद्विदाहिनः॥
(अ.ह.सू. 5/45-46)

Among all varieties of Ikshu, Poundraka type of sugarcane is the best one due to cool in potency, pleasing and sweet in taste and Vamsika is inferior to it followed by Sataparva, Kantara, Naipala etc. in their succeeding order as they are slightly alkaline and astringent in taste, hot in potency and cause burning sensation.

Phanita Guna (half cooked molasses)

फाणितं गुर्वभिष्यन्दि चयकृन्मूत्रशोधनम्।
(अ.ह.सू. 5/47)

Phanita (half cooked molasses) is having guru and Abhishyandi Guna and vitiates Dosha. It also acts as Mutra Shodhaka.

Guda (jaggery)/ Dhauta Guda Guna and Adhauta Guda Guna

नातिश्लेष्मकरो धौतः सृष्टमूत्रशकृद् गुडः॥
प्रभूतकृमिमज्जासृङ्मेदोमांसकफोऽपरः।
हृद्यः पुराणः पथ्यश्च, नवः श्लेष्माग्निसादकृत्॥
(अ.ह.सू. 5/47-48)

Guda (jaggery), washed well (made white and purified) Natishleshmakara (does not increase Kapha to a large extent), Srushtamutrashakrut (increases volume of urine and faeces). If it is not prepared properly, it causes Krimi (intestinal worms), increases chances of Kapha disorder in Majja, Rakta, Meda, Mamsa and Kapha.

Matsyandikadi (brown sugar)

वृष्याः क्षीणक्षतहिता रक्तपित्तानिलापहाः।
मत्स्यण्डिकाखण्डसिताः क्रमेण गुणवत्तमाः॥
(अ.ह.सू. 5/49)

Matsyandika (brown sugar), Khanda (sugar

click here -} dhruvataare

candy) and Sita (white crystalline sugar) in their succeeding order are better. They are Vrushya (aphrodisiac), Kshinakshatahita (good for the emaciated and the wounded), useful in Raktapitta (bleeding diseases) and aggravation of Vata.

Yava sharkara Guna

तद्गुणा तिक्तमधुरा कषाया यासशर्करा।
(अ.हृ.सू. 5/50)

Yavasharkara (sugar prepared from Yavasaka plant) is similar in properties to sugar but is Tikta (bitter), Madhura (sweet) and Kashaya (astringent) in taste.

Sharkara Guna

दाहतृट्च्छर्दिमूर्च्छासृक्पित्तघ्न्यः सर्वशर्कराः ॥
(अ.हृ.सू. 5/50)

All types of sugars are useful in Daha (burning sensation), Trishna (thirst), Chardhi (vomiting), Asruk Pittaghna (fainting and bleeding diseases).

शर्करेक्षुविकाराणां फाणितं च वरावरे।

Among the products of Ikshu Vikara (sugarcane juice), Sharkara (sugar) is the best and Phanita (half cooked molasses) is the least.

Ikshu Rasa Guna (Qualities of sugar cane juice)

Madhya Varga / Sandhana Varga (Alcoholic Beverages)-

Madya, Sidhu, Maireya, Ira, Madira, Kadambari, Varuni, Hala and Balavallabha are synonyms of Madya. All kinds of Madya is hot in potency, aggravates Pitta, mitigates Vata, causes purgation, undergoes digestion quickly, creates dryness and especially mitigates Kapha, sour in taste, kindles digestive taste, digestive, quickly in actions, penetrating, enters into minute pores, spreads quickly and produces looseness of joints.

Madya Varga and Samanya Madya Guna

अथ मद्यवर्गः।
दीपनं रोचनं मद्यं तीक्ष्णोष्णं तुष्टिपुष्टिदम् ॥
सस्वादुतिक्तकटुकमम्लपाकरसं सरम्।
सकषायं स्वरारोग्यप्रतिभावर्णकृल्लघु ॥
नष्टनिद्रातिनिद्रेभ्यो हितं पित्तास्रदूषणम्।
कृशस्थूलहितं रूक्षं सूक्ष्मं स्रोतोविशोधनम् ॥
वातश्लेष्महरं युक्त्या पीतं विषवदन्यथा।
(अ.हृ.सू. 5/62-64)

Madya (all alcoholic) beverages generally, Dipana (stimulate digestion), Rochana (help in perception of taste), Tikshna (penetrate deep), Ushna (hot in potency), Tushti Pushtida (give satisfaction and nourishment to body), Sasvadu Tikta Katukam (slightly sweet, bitter and pungent in taste), Amlapaka Rasa (sour at the end of digestion), Sara (laxative), Sakashaya (slightly astringent), Swara (pleasant voice), Arogya (improves health), Pratibha (talent), Varna (colour and complexion), Laghu (easy to digest).

Beneficial to those having Nashtanidra (loss of sleep) or Atinidra (excess sleep) for both Krusha (lean) and Sthula (stout) persons; Ruksha (non viscid), Sukshma Strotovishodhana (capable of entering through minute pores and cleansing them), mitigate Vata and Kapha, all these if used with care; but used otherwise, they act as a poison.

Sura Guna

गुल्मोदरार्शोग्रहणीशोषहृत् स्नेहनी गुरुः।
सुराऽनिलघ्नी मेदोऽसृक्स्तन्यमूत्रकफावहा ॥
(अ.हृ.सू. 5/67)

Sura is useful in Gulma (abdominal tumours), Udara (enlargement of the abdomen), Arsha (haemorrhoids), Grahani (duodenal diseases), Shosha (emaciated).

Sura is Snehani (lubricating), Guru (hard to digest), mitigates Vata, causes increase of Meda (fat), Aruka or Rakta (blood), Stanya (milk), Mutra (urine) and Kapha.

Varuni Sura Guna

तद्गुणा वारुणी हृद्या लघुस्तीक्ष्णा निहन्ति च।
शूलकासवमिश्वासविबन्धाध्मानपीनसान् ॥
(अ.हृ.सू. 5/68)

Varuni is having similar qualities to that of Sura. In addition to the above, it is having Laghu (easy to digest), Tiksna Guna, Nihanti (not so harmful), Hrudya (gives strength to the heart). It is useful to relieve Shula, Kasa, Chardi, Shvasa,

click here - j.dhruvatsava

Vibandha, Adhmana and Pinasa.

Bibhitaki Sura Guna

नातितीव्रमदा लघ्वी पथ्या बैभीतकी सुरा।
व्रणे पाण्ड्वामये कुष्ठे न चात्यर्थं विरुध्यते॥
(अ.ह.सू. 5/69)

Vibhitaki Sura is not causing severe toxicity (Natitivramada), Laghu (light to digest) and Pathya (wholesome). It is not so harmful in the conditions like Vrana (wound), Pandu (anaemia), Kustha (skin diseases) etc. as that of other alcoholic preparations.

Yava Sura Guna

विष्टम्भिनी यवसुरा गुर्वी रूक्षा त्रिदोषला।
(अ.ह.सू. 5/70)

If Sura is made from Yava (barley) it will lead to Vishtambha (constipation). The Yava Sura is Gurvi (not easy to digest), Ruksha (non-unctuous) and Tridoshala (provoke all the three Doshas).

Arishta Guna

यथाद्रव्यगुणोऽरिष्टः सर्वमद्यगुणाधिकः॥
ग्रहणीपाण्डुकुष्ठार्शःशोफशोषोदरज्वरान्।
हन्ति गुल्मकृमिप्लीह्नः कषायकटुवातलः॥
(अ.ह.सू. 5/71)

Generally, Arishta are having similar properties of the Dravya (drugs), which are used for their preparation. Hence Arishta are superior in quality among other types of alcoholic preparations. They are useful in the management of Grahanl Roga (disease of the duodenum), Pandu (anaemia), Kustha (skin disease), Arsha (haemorrhoids), Shopha (swelling), Shosha (emaciation). Udara (abdominal distension), Jwara (fever), Gulma (tumour), Kimi (worms) and Pleeha (disorders of spleen). They are having Kashaya (astringent), Katu (pungent) and aggravate Vata Dosha.

Mardvika Sura (wine prepared from grapes)

मार्द्वीकं लेखनं हृद्यं नात्युष्णं मधुरं सरम्।
अल्पपित्तानिलं पाण्डुमेहार्शःकृमिनाशनम्॥
(अ.ह.सू. 5/72)

Mardvika (wine prepared from grapes) is Lekhana (scraping), Hrudaya (good to the heart), Natyushna (not very hot in potency), Madhura Rasa (sweet in taste), Sara (laxative), causes slight increase of Pitta and Anila (Vata), useful in Pandu (anaemia), Meha (diabetes), Arsha (haemorrhoids) and Kriminashana (intestinal parasites).

Kharjura Sura (wine prepared from dates)

अस्मादल्पान्तरगुणं खार्जूरं वातलं गुरु।
(अ.ह.सू. 5/73)

Kharjura Sura is inferior in properties than Mardvika Sura (wine prepared from grapes), aggravates Vata, and Guru (hard for digestion).

Sharkara Madya Guna (wine prepared from sugar)

शार्करः सुरभिः स्वादुर्हृद्यो नातिमदो लघुः॥
(अ.ह.सू. 5/73)

Sharkara Madya is Surabhi (sweet smelling), Swadu (sweet in taste), Hrudya (good for the heart), Natimado (not very intoxicating) and Laghu (easy to digest).

Goudamadya Guna (wine prepared from molasses)

सृष्टमूत्रशकृद्वातो गौडस्तर्पणदीपनः।
(अ.ह.सू. 5/74)

Gouda (prepared by using molasses) is useful for the proper elimination of Mutra (urine), Shakruta (faeces) and Adhovata (flatus), It also gives Tarpana (nourishing properties) and Dipana (increasing hunger).

Sidhu (wine prepared from sugar juice)

वातपित्तकरः सीधुः स्नेहश्लेष्मविकारहा॥
मेदःशोफोदरार्शोघ्नस्तत्र पक्वरसो वरः।
(अ.ह.सू. 5/75)

Sidhu (wine prepared from sugarcane juice) aggravates Vata and Pitta. It is indicated in the diseases caused due to excessive Sneha (oleation) and due to the vitiation of Kapha, Medoroga (obesity), Shopha (swelling), Udara (enlargement of abdomen) and Arsha (haemorrhoids).

Madhvasava (wine prepared from honey)

छेदी मध्वासवस्तीक्ष्णो मेहपीनसकासजित्॥
(अ.ह.सू. 5/75)

Madhvasava (wine prepared from honey) is having Tikshna Guna and is Chedi (useful to break

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the solidified materials like Kapha, Mala etc.) in the body. It is indicated in the management of Prameha (diabetes), Pinasa (rhinitis) and Kasa (cough).

Shukta (wine prepared from tubers)

रक्तपित्तकफोत्क्लेदि शुक्तं वातानुलोमनम्।
भृशोष्णतीक्ष्णरूक्षाम्लं हृद्यं रुचिकरं सरम्॥
दीपनं शिशिरस्पर्शं पाण्डुदृक्कृमिनाशनम्।
(अ.ह.सू. 5/76)

Shukta (wine prepared from tubers) increases the moisture of Rakta, Pitta and Kapha. It is Vatanilomana (useful for the downward movement of Vata). It contains Amla Rasa (sour in taste) and Ushna (hot), Tikshna (penetrating), Ruksha (dryness) and Sara Guna. It is Hrudya (wholesome to the heart) and Ruchikara (increases the perception of the taste). It also Dipana (increases the power of digestion), Shishira Sparsha (cold in touch). It is indicated in the management of Pandu Roga (anaemia), Netra Roga (Druka) and Krimi Roga.

गुडेक्षुमद्यमार्द्वीकशुक्तं लघु यथोत्तरम्॥
(अ.ह.सू. 5/77)

Shukta prepared from Guda, Ikshu Rasa, Madya and Mardvika are superior to one another and Laghu (easy to digest) in their succeeding order.

कन्दमूलफलाद्यं च तद्वद्विद्यात्तदासुतम्।
(अ.ह.सू. 5/77)

Wine prepared from Kanda (tubers), Mula (roots) and Phala (fruits) are also having similar properties of those from which they are being prepared.

Shandika

शाण्डाकी चासुतं चान्यत्कालाम्लं रोचनं लघु॥
(अ.ह.सू. 5/78)

Asava prepared by using Shandaki (balls of fried paddy mixed with spices, dried in sun and then deep fried in oil) and by other material (such as oil-cakes etc) which have turned Amla (sour) by lapse of time are Rochana (increase the perception of taste) and Laghu (easy to digest).

Dugdha Varga (Milk and Milk products)

Gavyadugdha Guna (Group of milk and milk products)

स्वादे पाकरसं स्निग्धमोजस्यं धातुवर्धनम्॥
वातपित्तहरं वृष्यं श्लेष्मलं गुरु शीतलम्।
प्रायः पयः..... (अ.ह.सू. 5/20)

Milk in general consists Swadupakarasa (sweet in taste) and Swadupaka (also at the end of digestion), Snigdha (unctuous), Ojovardhana (increases Ojus), Dhatuvardhana (nourishes and increases body tissues), Vata Pittahara (mitigates Vata and Pitta), Vrushya (aphrodisiac), Shleshmala (increases Kapha), Guru (heavy to digest) and Sheetala (coolant).

Go Kshira (cow milk)

.....अत्र गव्यं तु जीवनीयं रसायनम्॥
क्षतक्षीणहितं मेध्यं वल्यं स्तन्यकरं सरम्।
श्रमभ्रममदालक्ष्मीश्वासकासातितृट्क्षुधः॥
जीर्णज्वरं मूत्रकृच्छ्रं रक्तपित्तं च नाशयेत्।
(अ.ह.सू. 5/21-22)

Qualities of cow milk - Jeevaneeya (promotes long life), Rasayana (rejuvenating), Kshata-ksheenahita (good for those emaciated after chest injury), Medhya (increases intelligence), Balya (strengthening), Stanyakara (promotes breast milk production) and Sara (helps easy movement of the bowels).

Benefits of cow milk- Go Kishra relives Shramahara (exhaustion), Bhramahara (dizziness or giddiness), Mada (toxicity), Alakshmi (in-auspiciousness), Shwasa (dyspnoea), Kasa (cough), Atitrut Kshudha (severe thirst and hunger), Jeernajvara (chronic fevers), Mutrakrichra (dysurea) and Raktapitta (bleeding diseases).

Mahishi Kshira (buffalo milk benefits)

हितमत्यग्न्यनिद्रेभ्यो गरीयो माहिषं हिमम्॥
(अ.ह.सू. 5/23)

Mahisha Kshira (buffalo's milk) is indicated for the persons having Atyagni (increased power of digestion) and Anidra (insomnia). Mahisha Kshira (buffalo's milk) is Guru (heavy in quality) and Shita (cold in potency).

Click here -} dhruvataara

Aja Kshira (goat milk)

अल्पाम्बुपानव्यायामकटुतिक्ताशनैर्लघु ।
आजं शोषज्वरश्वासरक्तपित्तातिसारजित् ॥
(अ.ह.सू. 5/24)

Aja (goats) usually Alpa Ambu (drink less water), Vyayama (doing heavy exercise) and eat plants and the leaves having Katu (pungent) and Tikta (bitter in taste). Hence goat milk is Laghu (easily digestible) and is indicated in Shosha (emaciation or tuberculosis), Jwara (chronic fevers), Shwasa (dysponea), Raktapitta (bleeding disorder) and Atisara (diarrhoea).

Ushtra Kshira (camel milk)

ईषद्रूक्षोष्णलवणमौष्ट्रकं दीपनं लघु ।
शस्तं वातकफानाहकृमिशोफोदरार्शसाम् ॥
(अ.ह.सू. 5/25)

Ushtra ksheera (milk of camel) is Ishat Ruksha (slightly dry), Ushna (hot), Lavana (salty taste), Dipana (increases digestion strength), Laghu (easy to digest), Vatakaphaan Shastam (useful in Vata and Kapha), Krumi (relieves worm infestation), Shopha (anti-inflammatory), Udara (abdominal distension) and Arsha (haemorrhoids).

Manusha Kshira Guna (breast milk benefits)

मानुषं वातपित्तासृगभिघाताक्षिरोगजित् ।
तर्पणाश्च्योतनैर्नस्यैः..... (अ.ह.सू. 5/26)

Breast milk is indicated in Akshiroga (eye disorders) caused by the vitiation of Vata, Pitta, Asruk (blood vitiation disorder), Abhighata (useful in injuries) being used as Tarpana and Ashchottana and Nasya (nasal drops).

Avika Kshira (sheep milk)

.....अह्रद्यं तूष्णमाविकम् ॥
वातव्याधिहरं हिध्माश्वासपित्तकफप्रदम् । (अ.ह.सू. 5/26)

Sheep's milk is Ushna (hot in potency) and Ahrudya (not good for heart). Relieves Vata disorders. Increases Hidhma (hiccough), Shwasa (dyspnoea), Pitta and Kapha.

Hastini Kshira Guna (elephant milk)

स्थैर्यकृद.....
हस्तिन्याः
अन्वयः- हस्तिन्याः (क्षीरम) स्थैर्यकृत् (भवति) ।
(अ.ह.सू. 5/27)

Elephant's milk gives Sthiryakrut (good strength to the body).

Ekashapha Kshira (milk of single hoofed animals)

.....वाडमुष्णं त्वैकशफं लघु ॥
शाखावातहरं साम्ललवणं जडताकरम् ।
(अ.ह.सू. 5/27)

Milk of single hoofed animals (like horse, donkey, etc) is Ushna (very hot in potency) and Laghu (easily digestible), useful in Vata disorders, is slightly Amla (sour) and Lavana (salt) and causes Jadatakara (lassitude).

Dugdha Panarha (persons suitable for drinking milk) (Bha, Pra. Dugdha Varga 3-6)Dugdha Panarha (persons suitable for drinking milk) (Bha, Pra. Dugdha Varga 3-6)

Milk is to be consumed by those who have undergone purgation, emesis and enema therapies, those suffering from chronic fever, mental diseases, consumption, fainting, giddiness, diseases of the heart, abdominal pain, upward movement of gas inside, abdominal tumor, diseases of the urinary bladder, piles, bleeding diseases, diarrhea, diseases of the vagina, fatigue and exhaustion, and abortion, it is always ideal for children the aged, wounded and specially to those emaciated by hunger and excess of copulation.

Varieties of milk-

Dodugdha, Mahisa, Aja, Mruga, Avika, Austral, Badava, Hastini, Nari milks.

Masala and Vyanjana Dravyas (Spices & Condiments)

Trijata and Chaturjata

सकेसरं चतुर्जातं त्वकपत्रैलं त्रिजातकम ।
पित्तेप्रकोपि तीक्ष्णोष्णं रुक्षं रोचनदीपनम ॥
(अ.ह.सू. 6/160)

Twak - (Cinnamon), patra (Cinnamon leaf) and Ela - (Cardamom) together are known as Trijataka and these along with Kesara from the Chaturjata. They aggravation of Pitta, are penetrating, hot in potency, cause dryness, improve taste and hunger.

click here -} dhruvataare

Maricha (pepper) black pepper is pungent both in taste and at the end of digestion, mitigates Kapha and is easily digestible.

Pippali (Long pepper), in its green state aggravates Kapha, is sweet in taste and cold in potency, not easily digestible and is unctuous. The same, when dry, becomes opposite aphrodisiac, pungent in taste, sweet at the end of digestion, mitigates Vata and Kapha, use in asthma, cough; is laxative. Long pepper should not be used in excess, for long period, without following the regimen of rejuvenation therapy.

Nagara - (ginger), increases hunger, is aphrodisiac, water absorbent, good for the heart (or the mind), relives constipation, bestows, taste, easily digestible, sweet at the end of digestion, unctuous, hot in potency and mitigates Kapha and Vata. Similar is Ardraka (fresh ginger, green).

त्रिकटु-

.....एतच्च त्रयं त्रिकटुकं जयेत।
स्थौल्याग्निसदनश्वासकासश्लीपदपीनसन ॥

(अ.ह.सू. 6/164)

Shunthi, Maricha and Pippali – together have known as Trikatu, useful in obesity, asthma, dyspepsia, cough, filariasis and chronic nasal catarrh.

Chavaika (Piper chaba) and Pippalimula (long pepper root) possess qualities and properties similar to Marica (black pepper) but in lesser degree.(A. Hru. Su.6/165)

Chitraka is similar to fire in digesting thing and cures dropsy, hemorrhoids, worms and leprosy (and other skin diseases). (A. Hru. Su. 6/166)

पञ्चकोल–

पञ्चकोलकमेतच्च मरिचेन विना स्मृतम।
गुल्मप्लिहोदरानाहशूलघ्न दीपनं परम ॥

(अ.ह.सू. 6/166)

The above, excluding Marica, (Pippali, Pippalimula, Cavya, Citraka and Nagara) is known as Panchakolaka. It cures abdominal tumors, disease of the spleen, enlargement of the abdomen, distension and colic, and is best to improve hunger and digestion.

बिल्व पञ्चमूल–

बिल्वकाश्मर्यतर्कारीपाटलाटिण्टुकैर्महत ।
जयेत्कषायतिक्तोष्णं पञ्चमूल कफनिली ॥

(अ.ह.सू. 6/17)

ह्रस्वं बृहत्यंशुमतीद्वयगोक्षुरकैः स्मृत।
स्वादुपाकरसं नातिशीतोष्णं सर्वदोषजित ॥

(अ.ह.सू. 6/168)

Bilwa, Kasarya, Tarari, Patala and Tintuka are together known as Mahat panchamula. It is astringent and bitter in taste, not in potency, mitigate Kapha and Vata. Brihatidwaya (Brihati and Kantakari), Amsumatidwaya (Saliparni and Prsniparni) and Goksuraka- together are known as Hrasva Panchamula (Laghu Panchamoola). It is sweet in taste and at the end of digestion, neither very hot nor very cold in potency and mitigates all the Doshas.

Jala Varga

Ganga Jala Guna / Gangambu

जीवनं तर्पणं हृद्यं ह्लादि बुद्धिप्रबोधनम्।
तन्वव्यक्तरसं मृष्टं शीतं लघ्वमृतोपमम् ॥
गङ्गाम्बु नभसो भ्रष्टं स्पृष्टं त्वर्केन्दुमारुतैः।
हिताहितत्वे तद्भूयो देशकालावपेक्षते ॥

(अ.ह.सू. 5/1-2)

Rain water is which has come into contact with sunlight, moon light and wind is Jeevaneeya (enlivening, improves quality of life), Tarpana (satiating), Hrudya (good for heart), Hladi (calming and soothing to the mind and stomach), Buddhi Prabodhanam (stimulates intellect), Tanu (thin), Avyaktarasa (imperceptible taste), Shita (cold), Laghu (light to digest) and Amrutopama (similar to nectar). Whether rain water is good or bad depends on the season and place where it rains.

Nadi Jala (river water)

पश्चिमोदधिगाः शीघ्रवहा याश्चामलोदकाः ॥
पथ्याः समासात्ता नद्यो विपरीतास्त्वतोऽन्यथा।

(अ.ह.सू. 5/8)

Water of the rivers which flow into the western direction (Arabian sea), which have pure water (uncontaminated) is good for health, whereas that

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flowing into eastern direction is not ideal for consumption.

Narikelodaka (coconut water benefits)

नारिकेलोदकं स्निग्धं स्वादु वृष्यं हिमं लघु।
तृष्णापित्तानिलहरं दीपनं बस्तिशोधनम्॥
(अ.ह.सू. 5/19)

Narikelodaka (coconut water) is Snigdha (unctuous, oily), Swadu (sweet), Vrushya (aphrodisiac), Hima (coolant) and Laghu (easy to digest).

Narikelodaka (coconut water) relieves Trishna (thirst), Pittanilahara (balances Pitta and Vata), Deepana (increases hunger) and Bastishodhana (cleanses urinary bladder).

Syllabus- Definition of Pro-biotics and Pre-biotics and their utility.

Learning objectives- Define Pro-biotics and Pre-biotics and explain their utility

Definition of Pro-Biotics and Pre-Biotics and Their Utility

Probiotics

Probiotics are live microorganisms promoted with claims that they provide health benefits when consumed, generally by improving or restoring the gut microbiota. Probiotics are considered generally safe to consume, but may cause bacteria-host interactions and unwanted side effects in rare cases. There is some evidence that probiotics are beneficial for some conditions, but there is little evidence for many of the health benefits claimed for them.

According to WHO) defines probiotics as "live microorganisms which when administered in adequate amounts confer a health benefit on the host."

Live probiotic cultures are part of fermented dairy products, other fermented foods, and probiotic-fortified foods. Additionally, lactic acid bacteria (LABs), which are food fermenting bacteria, have the ability to prevent food spoilage and can improve the nutritive value of the foods they inhabit. Also due to its low cost and low energy requirements when processing and preparing foods, acid fermentation, combined with salting, remains one of the most practical methods of preservation of fresh vegetables, cereal gruels, and milk-cereal mixtures.

Fermented products that contain lactic acid bacteria include vegetables such as pickled vegetables, kimchi, pao cai, and sauerkraut; sourdough bread or bread-like products made without wheat or rye flour, amino acid/peptide meat-flavoured sauces and pastes produced by fermentation of cereals and legumes; fermented cereal-fish-shrimp mixtures and fermented meats; soy products such as tempeh, miso, and soy sauce; dairy products such as yogurt, kefir, buttermilk; and non-dairy products such as bee pollen.

Prebiotics

Prebiotic was described as "a non-digestible food ingredient that beneficially affects the host by selectively stimulating the growth and/or activity of one or a limited number of bacteria in the colon, and thus improves host health".

Prebiotics are compounds in food that foster growth or activity of beneficial microorganisms such as bacteria and fungi. The most common environment considered is the gastrointestinal tract, where prebiotics can alter the composition of organisms in the gut microbiome.

Dietary prebiotics are typically nondigestible fiber compounds that pass undigested through the upper part of the gastrointestinal tract and help growth or activity of advantageous bacteria in the colon by acting as substrates for them.

Compounds that can be classified as prebiotics must also meet the following criteria:

1. Non-digestible and resistant to breakdown by stomach acid and enzymes in the human gastrointestinal tract
2. Fermented by microorganisms on or in the body
3. Stimulating growth and activity of beneficial bacteria

There are many types of prebiotics. The

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majority of them are a subset of carbohydrate groups and are mostly oligosaccharide carbohydrates (OSCs). Example- Fructans, Galacto-Oligosaccharides, Starch and Glucose-Derived Oligosaccharides and Other Oligosaccharides, Non-Carbohydrate Oligosaccharides.

Prebiotics play an important role in human health. They naturally exist in different dietary food products, including asparagus, sugar beet, garlic, chicory, onion, Jerusalem artichoke, wheat, honey, banana, barley, tomato, rye, soybean, human's and cow's milk, peas, beans, etc., and recently, seaweeds and microalgae.

Syllabus- Proximate principles of Food – Recommended Daily Allowance according to various conditions, Sources and deficiency diseases of Protein, Carbohydrate, Fats, Vitamins, and Minerals.

Learning objectives- Explain the Proximate principles of Food, Recommended Daily Allowance according to various conditions, Sources, and deficiency diseases of Protein, Carbohydrate, Fats, Vitamins, and Minerals.

Proximate Principles of Food-Recommended Daily Allowance According to Various Conditions, Sources and Deficiency Diseases of Protein, Carbohydrate, Fats, Vitamins, and Minerals

Nutrition is a science of food and its relationship to health. Nutrition refers to nourishment that sustains life. The study of nutrient requirements and the diet providing these requirements is also known as 'nutrition'. Pike and Brown, 1984 defined it as "the science that interprets the relationship of food to the functioning of living organism. It includes the uptake of food, liberation of energy, elimination of wastes and all the processes of synthesis essential for maintenance, growth and reproduction".

Food consists of seven main components—carbohydrates, fats, proteins, vitamins, minerals, water and fiber. These components provide the six types of nutrients essential for human body, viz. energy, protein, vitamins, essential fatty acids, minerals and water. Fiber, though not usually labeled as a nutrient, is an important component of food and its deficiency gives rise to various disease syndromes. The basic role of fats and carbohydrates in nutrition is similar, i.e. to act as source of energy. It is true that fats also supply the essential fatty acids, but the deficiency of the latter is rate. Proteins, fats and carbohydrates are sometimes referred to as proximate principles of foods.

Nutrient- It is a chemical factor (active ingredient) present in food item, bwhich determines the quality of food and in turn the health of the individual. For example, proteins, fats, carbohydrates, vitamins and minerals.

Nutrition- It is that branch of science, which deals with the study of a dynamic process, in which the consumed food is utilized for nourishing the body (a process of assimilation of food).

Dietetics- It is the science that deals with the study of nutrition in health and disease (i.e. planning of meals for the healthy and the sick).

Nutrients

These are grouped into two groups—macro- and micronutrients.

Macronutrients

They are so called because they are required in large quantities and so they constitute the main bulk of the food. They are often called 'Proximate principles'. For example, proteins, fats and carbohydrates. Their contribution in the food is as follows:

Proteins—7 to 15 percent

Fats—10 to 30 percent

Carbohydrates—65 to 80 percent

Micronutrients

They are so called because they are required in small quantities (varying from micrograms to milligrams). For example, vitamins and minerals.

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Classification of foods-

There are many ways of classifying foods

1. Classification by origin-
   a. Food of animal origin
   b. Foods of vegetable origin
2. Classification by chemical composition-
   a. Protein b. Fats
   c. Carbohydrates d. Vitamins
   e. Minerals
3. Classification by predominant function-
   a. Body building foods- e.g. milk, meat, poultry, fish, eggs, pulses, nuts etc.
   b. Energy giving foods- e.g. cereals, sugar, roots tuber, fats and oil.
   c. Protective foods- e.g. vegetables, fruits, milks
4. Classification by nutritive value-
   a. Cereals and millets
   b. Pulses
   c. Vegetables
   d. Nuts and oil seeds
   e. Fruits f. Animal foods
   g. Fats and oils
   h. Sugar and jaggery
   i. Condiments and spices
   j. Miscellaneous foods

1. Protein

Protein is also one of the major macronutrients. It contains carbon, hydrogen, oxygen and nitrogen. Some proteins also contain sulphur and phosphorus. The basic structure or building unit of protein is amino acid. It has an amino group-NH_2 and carboxyl group-COOH. The amino acids are joined by peptide linkages to form protein. Amino acids are water soluble, crystalline and insoluble in organic solvents.

Classification

There are about 22 amino acids present in the body. Nine amino acids are essential for humans, as humans cannot synthesize them. These are isoleucine, leucine, lysine, methionine, phenylalanine, threonine, trytophan, valine and histidine. Infants require two more essential amino acids (arginine and histidine). The non-essential amino acids are glycine, alanine, serine, cysteine, cystine, aspartic acid, glutamic acid, arginine, hydroxylysine, tyrosine, proline, and hydroxy-proline.

Proteins are of two types—complete and incomplete. A complete protein is one, which contains all the essential amino acids in required quantities. It is also called 'First class protein' or 'Protein of high biological value'. For example, animal proteins such as egg, milk, fish, etc.

An incomplete protein is one, which is deficient in one or more essential aminoacids. They are also called 'Second class proteins' or 'proteins of low biological value'.

For example, vegetable proteins such as cereals, pulses, etc. But there are exceptions. Gelatine obtained from animal source has low biological value and yeast derived from vegetable source soybean has high biological value.

Supplementary actions of proteins- Cereal proteins are deficient in lysine and threonine. Pulses are deficient in methionine, maize in lysine and tryptophan. These are known as 'Limiting amino acids'. When cereals and pulses are eaten together in combination, for example, Rice and Dal, their deficient amino acids supplement each other providing a protein comparable to first class protein in respect to essential amino acids. This is known as 'Supplementary actions of proteins'.

Functions of protein

It is the most important constituent of food.

1. They are essential for growth and develo-pment of the body (Body building).
2. They are essential for the repair of the tissues (wear and tear).
3. They are the constituents of enzymes, hormones, antibodies, plasma and hemoglobin.
4. They maintain osmotic pressure and thus maintain fluid balance in the body.
5. Secondary role as energy source, provide energy (1 gm provides 4 kcals of energy).

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6. They maintain the hydrogen ion concen-tration of the body fluid thus maintain the acid-base balance.
7. Required for the supply of the essential amino acids which cannot be synthesized in the body.

Deficiency - Low protein diets cause anemia, hypo-albuminemia and edema. Infants with improper weaning and fed on low protein diets suffer from physical and mental retardation along with anemia, hypoprotenemia, cheilosis, stomatitis, conjunctivitis edema and fatty liver. This is known as 'kwashiorkor'. These infants are frequently prone to infection and the mortality is high in such untreated children. Protein deficiency is generally observed with calorie deficiency and this condition is called 'protein calorie malnutrition'. Some studies have suggested that deficiency or imbalance of essential amino acids in the diet may produce profound depression of immune responses.

Recommended Dietary Allowance - For maintenance of nitrogen balance, the minimum protein requirement is 0.51-0.66g (av. 0.57g) per kg body weight. ICMR has recommended an allowance of 1.0 g per Kg for adults to provide 0.57g protein as an Indian vegetarian diet has a lower biological value of about 60 (net utilization of vegetable protein will be about 65% only. The requirement for infants and children is 1.5-2.0g/ Kg. During pregnancy and lactation an additional 10-20g-protein is recommended. It has been recommended that the diet should have at least 1/3 to ⅔ of total proteins from animal sources.

Dietary Sources

Animal sources- Meat, milk, egg-white, fish, cheese, etc. All these animal proteins contain all the essential amino-acids. Hence they are called First class proteins. However, the egg-proteins are considered to be the best animal protein, because of its high biological value and digestibility. Hence, egg protein is called 'Reference protein'.

Vegetable sources- These are cereals, pulses, beans, nuts, oil-seed cakes, etc. They are poor in essential amino acids. They are called Second class proteins. Still, they are the main sources of protein in India, because they are cheap, easily available and consumed in bulk compared to animal sources and majority are vegetarians.

Protein Energy Malnutrition

Protein Energy Malnutrition (PEM) is a deficiency disease caused in the infants due to 'Food Gap' between the intake and requirement. It affects children under 5 mostly belonging to the poor underprivileged communities. PEM is particularly serious during the post-weaning stage and is often associated with infection.

The term PEM covers a wide spectrum of clinical stages ranging from the severe forms like kwashiorkor and marasmus to the milder forms in which the main detectable manifestation is growth retardation.

Etiology of PEM

There are many causes which contribute to PEM: -

Diet

1. A diet which is deficit in protein and energy or calories results in PEM.
2. Through prolonged breastfeeding of children should be the rule, the amount of breast milk secreted in poor Indian mothers is lower.

Social and Economic factors

1. Poverty is one of the major causes of PEM, which leads to low food availability and unsanitary living condition which is the root cause infections and other diseases. Improper distribution of food among the family members.
2. Improper child care, neglect etc. may also lead to PEM. Misconceptions, about food, lack of knowledge, lack of adequate feeding during illness may all lead to PEM.

Environmental Factors

1. Overcrowding of living space along with unsanitary living conditions lead to frequent infections like diarrhoea.
2. Infection and diarrhoea are the common diseases that cause severe PEM and death.

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Biological factors

1. Maternal malnutrition before and during pregnancy may already make the child vulnerable to under nutrition and proper care and nutrition if not provided post birth may cause PEM.
2. Infectious diseases are major contributing cause of PEM. Diarrhoeal diseases, measles, respiratory and other infections decrease the body's immunity. Lack of adequate nutrition further hinders the nutritional status. As the needs of the child are not fulfilled and the child becomes deficit in Energy and protein primarily along with many other micro-nutrient deficiencies.

Role of free Radicals and Aflatoxins

Free oxygen radicals potentially are toxic to all cell membranes and are produced in the body during infections. These free radicals are not combatted well when the diet of the child is deficit in micronutrients like Vitamin A, C and E. There is thus an accumulation of toxic free radicals and aflatoxins in the body which harm the liver cells and may cause kwashiorkor.

Age of the host

1. Adequate food is the most important requisite for growth. While it is important throughout childhood, it is more crucial during the first 5 years of a child's life especially during the first 3 years when the growth is rapid.
2. PEM in pregnant and lactating women can affect the growth of the baby.
3. Elderly population may also suffer from PEM due to alteration in their gastrointestinal system as they age.

PEM classification

There are many methods that have been suggested to classify. New WHO Child Growth Standards Currently, the new Growth Standards are being used across the country for monitoring and promotion of young child growth and development within the National Rural Health Mission (NRHM) and the Integrated Child Development Services (ICDS)

Acute malnutrition Classification

Moderate Acute Malnutrition (MAM) is defined by WHO/UNICEF as:
Weight-for-Height Z-score <-2 but >-3
Severe Acute Malnutrition (SAM) is defined by WHO/UNICEF as:
MUAC<11.5cm
Weight-for-Height Z-score <-3
Bilateral pitting oedema
Marasmic-kwashiorkor (both wasting and oedema)

Diagnostic criteria for SAM in Children aged 6-60 months Indicator Measure Cut-off		
Indicator	Measure	Cut-off
Severe wasting (2)	Weight-for-height (1)	< -3 SD
Severe wasting (2)	MUAC (Mid upper arm circumference)	<115 mm
Bilateral oedema (3)	Clinical sign	

1-based on WHO Standards (www.who.int/childgrowth/standards)

2, 3 independent indicators of SAM that require urgent action

Indian Academy of Pediatrics

The classification provided by the IAP (Indian Academy of Pediatrics), is also based on weight for age but the cut off level to separate the malnourished children is 80 % of the standard. Severely malnourished children are classified into grade III and grade IV malnutrition.

Malnutrition	Body Weight (% of standard)*
Grade I	71-80
Grade II	61-70
Grade III	50-60
Grade IV	<50

Marasmus

Repeated infections and inadequate food

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consumption leads to protein energy malnutrition. Marasmus is a form of PEM, where growth is severely retarded. Marasmus usually occurs in the first 2 years of life.

Symptoms of Marasmus

1. The child has very less subcutaneous fat and muscle however there is no oedema.
2. The head of the child seems larger than the body, and has very little hair.
3. The child is below 60% of her weight for age, and the height of the baby is also affected.
4. The skin has some pigmentation or peeling skin lesions.
5. The ribs of the child are visible because of the absence of tissue under the skin and the rib cage is prominent which gives the appearance of rickety rosary a symptom of calcium deficiency.
6. The abdomen of the child appears extended and protruding due to the weakness of abdominal walls and wasting.
7. The child suffers and is more prone to infections.
8. The child is irritable and whines a lot.
9. The child loses interest in her/his environment and is inactive.
10. The fat on the face is last to go, post which the child gives the appearance of an old man. The child has shrivelled body, wrinkled skin and bony prominences.
11. Moderate degree of anemia and other deficiencies are also there in the child.
12. The appetite of the child lowers considerably and when adequate food is given catch up growth is seen.

Kwashiorkor

Kwashiorkor is another form of PEM, is it uncommon in the children under one year of age.

Symptoms of Kwashiorkor

1. The three essential features of kwashiorkor are growth failure, edema and mental changes.
2. The weight of the child depends upon the extent of edema in the body and it is usually less than 60% of the expected weight for age of the child.
3. The height of the child is affected more and the retardation is more pronounced than Marasmus.
4. Pitting edema appears first on the feet and legs and later spreads to the whole body.
5. The face looks puffy with sagging cheeks and swollen eye lids.
6. Abdomen is distended but ascities is rare.
7. The liver is enlarged due to fatty infiltration.
8. The symptoms include apathy (laziness), a moon face appearance due to edema, unlustrous and less hair.
9. Loss of hair results in patchy alopecia. The texture of the hair is dull and can be pulled out easily.
10. There are some changes seen in the skin as well, like pigmented or de-pigmented patches, peeling leading to crazy pavement dermatosis and even ulcers.
11. Anorexia is common.
12. Diarrhoea may occur due to defective digestion and absorption as a result of secondary infection.
13. Associated iron and folate deficiencies may lead to anemia.

Marasmic Kwashiorkor

Marasmic Kwashiorkor is the third form of PEM, where the child displays the symptoms of both Marasmus and Kwashiorkor. A child who does not have edema first may develop it later down the years. Since lack of adequate energy is common to both the conditions, the term PEM is more apt than Marasmus or Kwashiorkor.

Symptoms of Marasmic Kwashiorkor

The symptoms of Marasmic Kwashiorkor include signs of both conditions.

1. There is varying degree of muscle wasting, edema along with hair and skin changes.
2. There is the presence of moderate anemia, and

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along with it more than one vitamin deficiencies are also found.

3. Vitamin A deficiency is associated with severe malnutrition and may cause blindness.

Biochemical and Metabolic changes during PEM

1. Alteration in hormone levels can also lead to fluid retention.
2. Plasma levels of aldosterone are elevated in kwashiorkor but not in Marasmus.
3. Increased levels of ADH are seen in Kwashiorkor.
4. There are raised levels of plasma cortisol in PEM. The levels are higher in Marasmus than kwashiorkor.
5. Somatomedin activity is also reduced on kwashiorkor but not in Marasmus.
6. Plasma growth hormone levels are raised in kwashiorkor.

PEM affect Protein Metabolism-

1. Serum Concentration of total proteins is decreased
2. Infections may leads to increased concentration of globulins altering the A/G (Albumin/ Globulins) ratio.
3. Total serum amino acid is reduced particularly the branched chain amino acid.
4. Non-essential amino acids are normal or raised.
5. Serum concentration of many enzymes are reduced which reflects the low rate of protein synthesis.
6. Urinary output of nitrogen is low in malnourished children due to reduction in urea excretion.
7. There is a reduction in muscle mass.

PEM affect Lipid Metabolism

1. Varying degree of fat mal-absorption is seen in children with kwashiorkor.
2. There is a reduction in the activity of pancreatic enzyme, lipase.
3. In kwashiorkor, plasma levels of free fatty acids are raised while the levels of triglycerides, phospholipids and cholesterol are reduced.
4. There is a decrease in the concentration of conjugated bile acids.
5. The concentration of beta lipoprotein is decreased while that of the alpha lipoprotein is variable.
6. There is a reduction in the level of carnitine and there is impaired transport of fatty acids across the mitochondrial membrane for oxidation.
7. In Marasmus, the plasma levels of lipoproteins, triglycerides ad free fatty acids are normal.

PEM affect Carbohydrate Metabolism

1. Fasting blood sugar levels are lower.
2. Severe hypo-glycaemia is seen.
3. The glycogen stores are depleted which leads to fluctuation in the blood sugar levels.
4. Rate of gluconeogenesis is altered.

PEM affect Electrolyte and Water balance in the body

1. In kwashiorkor there is retention of fluid in the body in the extracellular compartments due to the inability of kidney to excrete sodium. This may occur due to altered renal function during PEM.
2. Hypo-albuminaemia is one of the important factors contributing to oedema.
3. Serum concentration of sodium is low, there is an excess of total sodium concentration in the body.
4. Potassium concentration of serum is reduced in kwashiorkor.

Hematological changes during PEM

1. There is moderate anemia, which is a common feature.
2. Protein deficiency leads to a reduction in hemoglobin synthesis and total red cell mass.
3. Associated iron deficiency leads to microcytic anemia.
4. Serum Vitamin B 12 levels are actually increased in PEM.
5. The red cell life is shortened in PEM along with various abnormalities of the red cell

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membrane, cell metabolism and composition.

6. The neutrophil leucocyte response to infection is often impaired.
7. Purpura and bleeding manifestations are seen in PEM.

Pathological changes that occur in PEM

1. Abnormalities in the organs may be seen in children suffering from PEM.
2. The gastro-intestinal tract is affected; there is atrophy of mucosa particularly in the jejunum.
3. There is marked cellular infiltration, of the lymphocytes and the plasma cells.
4. There is poor digestion and absorption due to mucosal changes associated with decreased enzyme activity in the body.
5. In kwashiorkor, liver is infiltrated with fat and hepatomegaly is common.
6. There is marked atrophy in severe PEM. Acinar cells shrink and the nuclei become pyknotic.
7. There is varying degree of duct proliferation.
8. Muscle wasting is a characteristic feature with severe reduction in individual fibers and increase in interstitial connective tissue. There is muscle wasting in other organs like intestines and heart.
9. The myocardial changes may lead to reduced cardiac output and electrocardiographic changes.
10. There is a reduction in brain size, a decrease in the number of cells in the cerebellum and brain stem.
11. The thymus is greatly reduced in size in children with PEM.

Dehydration be treated in PEM

Due to diarrhoea, dehydration may often be fatal if not treated on time. Assessment of hydration status is difficult in malnourished children. Skin elasticity is poor in children with Marasmus and their eyes are normally sunken. In kwashiorkor, the altered skin elasticity may be masked by oedema. Dryness of the mouth and skin, scanty urine and depressed fontanelle are more reliable signs in such cases.

Children with mild to moderate dehydration can be treated by oral or nasogastric administration of fluids. Severely mal nourished children are deficient in potassium and have abnormally high levels of sodium. WHO has recommended a modified solution for severely malnourished children (ReSoMal).

ReSoMal prepared

ReSoMal can be prepared by diluting the standard WHO ORS solution in 2 litres of water instead of 1 litre and adding 50g of sugar. Between 70 and 100 ml of ReSoMal/Kg body weight is usually enough to restore normal hydration. This should be given in small quantities at frequent intervals in the first 12 hours.

For children with severe dehydration, intravenous fluid therapy is required to improve the circulation and expand plasma volume rapidly. By providing 15 ml/kg/he I.V. drip of Ringer's lactate solution with 5% glucose.

Reassessment of the child every hour and switching to ReSoMal as soon as the child's condition's improves is advisable. When the urine flow is established, potassium supplements can be given orally (1-2 g/kg/day). It is recommended to start the feeding as early as possible.

PEM be treated with dietary management

Severe malnutrition or PEM require intensive care and should be referred to a hospital for initial treatment. Nutrition intervention is the primary consideration. The child should be given a diet providing sufficient quantities of calories and proteins, with an increase in amounts gradually without provoking vomiting or diarrhea. 170 – 200 kcal per kg of body weight and 3-4 g/ kg of body weight should be provided to the child.

It is suitable to initiate the feeding with a liquid formula gradually changing the consistency. The child may refuse the feed due to lack of appetite. Both proteins and calories are needed in large quantities. Sugar and vegetable oil should be added to increase the energy content.

Milk intolerance may be seen in severely

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malnourished children. In such cases, formulation should change to include buttermilk or dal based formulas. A mixed cereal based diet can be given with added oil to increase the energy.

Vitamin and mineral supplementation should be done to meet the increased requirements. These can be added to the diet or can be provided separately to the child. Vitamin A deficiency is quite common in children with severe PEM, hence a dose of 2 lakh IU of vitamin A should be provided to the child. Daily supplement of 60 mg/day of iron and 100 microgram/day of folic acid should be introduced in the diet.

Preventive measures in PEM

Malnutrition is a multifaceted problem and a variety of measures should be taken to prevent it. Since the effects of under nutrition are cumulative, entry point into the life cycle should be adolescents who will be future mothers and should be given adequate attention. Their nutrition should be ensured and the family should be educated against the false practices. Special intervention measures like supplementary feeding and nutrition education programmes can help in alleviating the problem. Preschool children are being provided supplementary nutrition at the Anganwadi centers. Several nutritious recipes have been developed by Food and Nutrition Board, National Institute of Nutrition and other home science colleges. Amylase rich food prepared from wheat or maize can also be used to reduce the bulk of the cereal mixture.

Government of India has prepared National Plan of Action, to bring down the prevalence of moderate and severe malnutrition. The essential components of any control programme are supplementary feeding, immunization, control of minor infections, promoting food security, nutrition communication, poverty alleviation and empowerment of women.

Nutrition Education

Nutrition education can help strengthen the various strategies formulated by the government for the eradication of PEM. These include –

1. Laying stress on breast feeding and especially exclusive breastfeeding for 6 months.
2. Mothers should be advised to give supplementary foods post 6 months based on the household foods like cereal and pulses. Oil or ghee can be added to increase the energy density of the food.

2. Fat

Fats are solid at 20 deg. C they are called oils. Fats are triglycerides of fatty acids and glycerol. Fatty acids have a fundamental structure of CH3(CH2)nCOOH. Fat is a concentrated source of energy providing 9kcal/g.

Classification

Based on the linkage between the carbon atoms, they are classified as saturated (carbon atoms linked by a single bond, e.g. denoted as 14:0); Monounsaturated (one double bond in the carbon chain, e.g. 16:1, n-9 denotes fatty acid with 16 carbon atoms); Polyunsaturated (more than one double bond, e.g. 20:4n- 6, denotes carbon atom with first of four double bond in 6 carbon atoms from methyl group).

The degree of unsaturation affects the properties of the fat /oil. All double bonds are usually in cis forms. The trans fatty acids are unsaturated fatty acids having double bond in the trans form, which is found to be more stable. But number of studies has indicated the association between adverse effects of trans fatty acids and coronary heart disease and lipoproteins profile. It is emphasized that the food industry reduces the trans fatty acids in its products. Fatty acids in food have even number of carbon atoms and have a mixture of fatty acid triglycerides. Due to the hydrophobic nature of fatty acids containing more than 8 atoms, it is insoluble in nature. Fats are solid at room temperature and contain more percentage of saturated fatty acid. Oils are liquid at room temperature containing more of unsaturated fatty acids. Animal fats predominantly have saturated fatty acids whereas the vegetable oils have unsaturated fatty acids.

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Metabolism

The digestion of fat takes place in small intestine with the help of bile and lipase enzyme into fatty acids and glycerol. These are again re-synthesized into triglyceride in the intestinal cell. The triglyceride is transported by lipoproteins, via lymph to blood where the small- chain triglycerides are absorbed directly into capillaries. Fats release 9 kcal per gm of fat.

Vegetable oils are extracted of from seeds, nuts and kernels. It is done either with the help of solvents or by mechanical pressure. The vegetable oils obtained may have some impurities such as gums, resins, coloring matter, free fatty acid etc. These are removed with the help of refining process, including a number of processes like degumming, neutralizing, washing and drying, bleaching and deodorizing. Care needs to be taken to prevent air contact as it causes deterioration due to oxidation.

Rancidity- The spoilage of oils and fats resulting in unpleasant odors and flavors is called rancidity. Two types of rancidity are known - hydrolytic and oxidative. Hydrolytic rancidity is the result of moisture in the oil; whereas oxidative rancidity is due to oxygen reaction with the unsaturated fatty acids. Naturally some antioxidants (like vitamins E) are present in vegetable oils to retard the rancidity. Hydrogenation is the conversion process of oil into fat to increase their melting point; the process of conversion is in the presence of catalyst (Nickel) e.g. vanaspati. This process converts the unsaturated fatty acids to saturated fatty acids and also converts the cis forms of unsaturated fatty acids to trans forms of unsaturated fatty acid. The latter are harmful for the heart. Animal fats contain Vitamin A & D, whereas Vitamin. E is present in vegetable oils.

Functions of fat

1. Fat is a concentrated source of energy providing 9kcal/gm.
2. It increases the palatability, taste and flavor of the food.
3. Subcutaneous fat acts as an insulator against cold.
4. Fat acts as cushion to viscera like heart, kidney, intestine etc. and gives support to them.
5. Helps in absorption of fat-soluble vitamins A, D, E and K.
6. Fats prevent proteins from being used up for energy. Hence, the fats are called 'Protein sparers'
7. They maintain the integrity of the skin (smoothness and healthiness)
8. They (EPA and DHA) reduce the serum cholesterol in the blood by transportation
9. They maintain enzyme system in the body.
10. They help in the synthesis of prostaglandins.
11. DHA is especially active in retina and cerebral cortex.
12. Fats gives smooth contour to the body.

Deficiency

1. The essential fatty acid deficiency known as phrynoderma is seen along with malnutrition.
2. Obesity- a diet rich in fat can pose a threat to human health by encouraging obesity. In fat people, adipose tissue may increase upto 30 percent.
3. Coronary heart disease- high intake (i.e. dietary fat representing 40 per cent or over of the energy supply and containing a high proportion of saturated fats) has been identified as major risk factor for CHD.
4. Cancer- in recent years, there has been some evidence that diets high in fats increase the risk of colon cancer and breast cancer.

Recommended Dietary Allowance

A minimum amount of fat is required to meet the requirement of essential fatty acids. As per the American Heart Association guidelines 20% or less of total energy from fats is recommended.

Fat from varied sources is preferred than from any single kind. Saturated fatty acids should provide 8-10% of total caloric intake, poly-unsaturated fatty acids should provide 5-8% & monounsaturated fatty acid should provide 3-7% of total calories intake.

In an Indian diet, it is recommended to use

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either groundnut, rice bran, seasame or sunflower, corn, cottonseed oil along with palm oil or any other oils mixed with mustard or soybean oil.

Animal Sources- These are ghee, butter, milk, cheese, egg yolk, meat and fish.

These are rich sources of saturated fatty acids (except fish).

Vegetable Sources (Edible Oils) - These are groundnut oil, mustard oil, gingelly oil, linseed oil, safflower oil, rapeseed oil, coconut oil and palm oil.

These are rich source of unsaturated fatty acids (except coconut oil and palm oil).

Certain amount of fat is also found among cereals (3–4%), pulses and other vegetables. It is called invisible fat.

3. Carbohydrates

Carbohydrates Cx(H2O)y/(CH2O)n is one of the macronutrients- a major energy source to the body. It provides 4kcal/g. Carbohydrates in food are present in the form of sugars and starch (polymers of sugar) and cellulose (non-starch polysaccharide). The simplest component of carbohydrate is glucose.

Classification

Carbohydrates are classified into mono, di, oligo and polysaccharides. There are six naturally occurring carbohydrates of interest in foods- glucose, fructose (monosa-ccharaides are simplest form of carbohydrate and cannot be hydrolyzed further); sucrose, maltose and lactose (disaccharides) and starch (polysaccharide). Simple carbohydrates (sugars) are crystalline solids and water-soluble.

Glucose (also called Dextrose /grape sugar/ corn sugar) is the simplest mono-saccharide and is widely available in nature. It is the major energy fuel for the human body.

Fructose (also known as Levulose / fruit sugar) is about twice sweeter than sucrose. It is used as sweetener by diabetics or obese people. It is also observed that fructose does not require insulin hormone for utilization.

Maltose (Malt sugar) - is an intermediate product of starch digestion. It is also present in malted and fermented grains. Maltose (malt sugar) on hydrolysis yields two glucose units.

Sucrose on hydrolysis yields equal parts of glucose and fructose.

Lactose (milk sugar) provides equal quantities of glucose and galactose on hydrolysis.

Polysaccharides (starch, glycogen) provide a number of monosaccharide units on hydrolysis. But the uncooked starch in food is not easy to digest, as the digestive juices can't penetrate the cell wall of plant, which contains the starch. Gelatinization of starch (powdered form) occurs when it is mixed with water and heated to 850 C, and this on cooling leaves a semisolid gel.

Glycogen is the reserve carbohydrate in man and animals present in liver and muscles and is synthesized from glucose.

Pectin found in soft fruits and in plant cell walls is a mixture of polysaccharides. Cellulose on hydrolysis by acids yields high number of D - glucose.

Starch (polymers of sugar-having a high molecular weight) is non-crystalline, insoluble in water and tasteless. Cereals have about 70% whereas legumes seeds have 40%of starch. Starch present in seed and roots of plants is composed mainly of two components amylose and amylopectin. Glucose units (i1, 4 linked) in a long unbranched chain are called amylose whereas highly branched unit with i1, 6 linked glucose units is amylopectin. Amylose starch produces blue colour on reaction with iodine. Starch is readily hydrolyzed by acids to glucose.

Metabolism

The digestion of carbohydrates starts in the mouth by the action of saliva and is finally broken down to the simplest unit which is absorbed in the small intestine. Carbohydrate digestion involves

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hydrolysis of disaccharide and polysaccharide to simple sugars. The monosaccharaides are transferred across epithelial cells and enter portal vein, with faster absorption of glucose and galactose than fructose. The series of reactions involving assimilation, utilization of glucose by body, is controlled by hormone insulin.

Ribose, xylose and arabinose are present in fruits and root vegetables. These are 5 carbon sugars (Pentoses- monosaccharides) and are of significance as are constituent of riboflavin (Vitamin B), RNA and DNA. These are not required in diet as these can be synthesized by all animals.

The non-digestible carbohydrates - cellulose, hemi cellulose, gums, mucilage, pectin and lignin in plant foods is called 'dietary fiber'. This is now also referred to as 'non-starch polysaccharide (NSP). They are classified as soluble and insoluble dietary fiber. They do not provide any nutritive value, but are helpful in many ways. Cellulose has a high molecular weight, is non-crystalline, insoluble in water and tasteless.

A normal value for blood glucose is 80-120mg/dl. Depending on the type of carbohydrate it has effect on the blood glucose levels. Glycaemic Index (GI) is the blood glucose response after having a carbohydrate meal. GI is affected by number of factors such as physical characteristics of food (intact or ground form), cooked or uncooked food, fibre content of food, presence of fat and protein in the diet.

Functions

1. Carbohydrate serves as a main source of energy. One gram of CHO yields 4 kcals of energy.
2. It is essential for the oxidation of fat (Fats are burnt in the fire of carbohydrate).
3. Carbohydrate is stored as glycogen in the liver and muscles. The reserve is rapidly exhausted when the person starves.
4. Excess of carbohydrate is stored as fat in the body.
5. It acts as a structural unit of nervous system, as cerebroside.
6. It exerts protein sparing action.
7. It adds flavor and texture to the food and increases palatability.

Deficiency

In case total energy requirement is not met by the diet, especially in young infants and children, malnutrition occurs.

Recommended Dietary Allowance

It has been recommended that carbohydrate in the diet be 55-65% of total energy with emphasis on complex carbohydrate. 40gm of dietary fiber in the daily adult diet is recommended (FAO/WHO, 1998).

Dietary Sources

Main sources of CHO are cereals, pulses, fruits, roots and tubers. Sugar, jaggery and honey are 100 percent carbohydrates. The CHO content of flesh foods is negligible. For dietary fiber bran is the richest source. In addition whole grains cereals, legumes, nuts, fruits and vegetable are good fiber source.

4. Vitamins

Vitamins are organic compounds. Although they are required in small amounts, but are essential for many important functions of the body. They cannot be synthesized by the body. Due to shortage of specific vitamins various deficiency diseases could occur. The vitamins were designated by letters A, B and so on before their structures were determined. Foods contain small quantities of these vitamins.

Classification- They are categorized into two groups- fat soluble vitamins-Vitamin A, D, E, K and water fat soluble vitamins-several B Vitamins and vitamin C.

Fat -Soluble Vitamins

Vitamin A / Retinol

Vitamin A is the general term used for several chemically related compounds such as retinol, retinaldehyde, retinoic acid and retinyl esters. Out

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of these retinol is the major natural occurring form (Vitamin A alcohol). Retinol is a pale yellow solid, which dissolves freely in oils and fats and is slightly soluble in water. It is relatively heat and alkali stable and unstable in light and to acid. It is found in fatty parts of foods especially animal foods. Retinol is a complex unsaturated alcohol of molecular formula $C_{20}H_{29}OH$. In animal tissues it is stored and transported as an ester formed with a long-chain fatty acid.

Metabolism

Vegetables contain no retinol. They have yellow pigments called carotenes, chemically related to vitamin A. Carotenes can be converted to retinol in the wall of the small intestine during absorption. Several carotenes are known; but the most important is beta-carotene, which is often referred to as 'pro-vitamin A'. The molecule of beta-carotene is almost exactly twice as big as that of vitamin A. It is an unsaturated hydrocarbon, not an alcohol. In the body, conversion of beta-carotene to retinol is less that is yields only 50% retinol. In addition, carotenes from vegetable food are not completely absorbed and the availability is 25-50 % depending on the diet and fat content in the diet. Thus based on the absorption and physiological conversion, a unit of beta carotene yields only 0.25 units of retinol in the body. . Retinol and carotenes are highly unsaturated and get easily destroyed by oxidation especially at high temperatures. As they are insoluble in water, there is no loss by extraction during boiling of vegetables. As retinol is not soluble in water the excess is accumulated in the liver, but excessive intake is to be avoided and may prove to be injurious.

Functions-

1. Retinol has an important function in the visual process; necessary for vision in dim light.
2. Is necessary for maintaining the integrity of healthy epithelium especially the membrane line of eyes, mouth, gastrointestinal, respiratory and genitourinary tract.
3. Is required for normal skeletal growth and tooth development.
4. Vitamin A also facilitates other functions such as for reproductive cycle, in iron metabolism.
5. Beta-carotene is a powerful antioxidant. It helps to protect the easily oxidized nutrients, such as PUFAs, from oxidation. It is also able to protest the body from the harmful effects of the free radicals in the body.

Deficiency

One of the earliest signs of vitamin A deficiency is known as 'night blindness'

1. **Night blindness-**A condition when it is difficult to see in dim light. It is caused by shortage of retinol derivative called 'rhodopsin'. Vitamin A is essential for the maintenance of healthy skin and mucous membranes.
2. **Conjunctional Xerosis-** this is the first clinical sign of vitamin A deficiency. The conjunctiva becomes dry and non- wettable. Instead of looking smooth and shiny, it appears muddy and wrinkled. It has been well described as "emerging like sand banks at receding tide" when the child ceases to cry.
3. **Bitot's spots-** Bitot's spots are triangular, pearly-white or yellowish, foamy spots on the bulbar conjunctiva on either side of the cornea. They are frequently bilateral. Bitot's spots in young children usually indicate vitamin deficiency. In older individuals, these spots are often inactive sequel of earlier disease.
4. **Corneal Xerosis-** This stage is particularly serious. The cornea appears dull, dry and non-weattable and eventually opaque. It does not have a moist appearance. In more severe deficiency there may be corneal ulceration. The ulcer may heal leaving a corneal scar which can affect vision.
5. **Keratomalacia-** keratomalacia or liquefaction of cornea is a grave medical emergency. The cornea may become soft and may burst open. The process is a rapid one. which can affect vision.

In severe vitamin A deficiency, child...

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changes, skin changes, degeneration of cells, with increase susceptibility to infection (eye, nasal passage, sinuses, middle ear, lungs and genitourinary tract) may occur.

Treatment and prevention of vitamin A deficiency-

For children below 6 years of age prophylactic dose of 50,000 international units is recommended. A daily oral dose of 10,000 international units vitamin A is advised in case of mild to moderate deficiency cases and 50,000 international units vitamin a for a week for severe cases.

Recommended Dietary Allowance

In a mixed Indian diet a conversion factor of 0.25 is required to calculate the retinol from beta – carotene in food. The daily requirement for adult man & women is 600ug; with an increase of 350ug for lactating women.

Dietary Sources

Retinol is found in animal tissues (liver, egg yolk) and dairy products (whole milk, butter, cheese). Fish liver oils are the richest source. Carotenes are found in plant tissues such as dark green vegetables (spinach, turnip leaves, beet greens, bathua etc.) and yellow fruits and vegetables (carrot, pumpkin, papaya, mango etc.) are good sources of carotene. Crude palm oil is also rich source of carotene.

Toxicity

Large intake (therapeutic dose) of vitamin A for long periods would lead to hypervitaminosis with symptoms such as nausea, headache, vomiting etc.

Vitamin E/Tocopherols

Vitamin E is a term used for tocopherols and tocotrienols and their derivatives. It is light yellow oil ($C_{29}H_{50}O_2$), stable to high heat and acid but decomposition occurs in UV light. Oxidation occurs in presence of rancid acid, lead and iron salts. In nature, four tocopherols and four tocotrienols occur, the difference being the number and the position of methyl groups on the chromanol ring. In addition several types of synthetic Vitamin E are available.

Function

The principal role of vitamin E is as an antioxidant, though the exact mechanism is not yet known. Various other functions are as follows:

1. Regulation of immune response through cell mediated immunity.
2. Protects from various diseases like cancer, arthritis and ischemic heart disease by preventing peroxidation and maintaining integrity of cellular membrane.
3. Prevents oxidation of beta carotene, vitamin A and vitamin C. Prevents lipid peroxidation of polyunsaturated fatty acids(PUFA) in cells.
4. In rats, Vitamin E affects the reproductive biology. But no such definitive role has been observed in human subjects.
5. The vitamin derivative is found to be necessary for Coenzyme Q synthesis.
6. They are used in the food industry as antioxidants and permitted food additives.

Deficiency

It is rarely observed in humans. It may be observed in subjects with either fat mal-absorption orsubjects on total parenteral nutrition (TPN) or in premature infants fed on formula feeds.

Recommended Dietary Allowance-The requirement is related to the fat and poly-unsaturated fatty acid (PUFA) content of the diet.For Indians, the requirement has been suggested to be as 0.8mg/g of essential fatty acids.

Dietary sources- Most of the cereal germ oils like wheat germ oil, corn oil and cottonseed oil, are good sources.

Vitamin D3/Cholecalciferol

Cholecalciferol (Vitamin D3) is the naturally occurring form on cells. It is obtained endogenously, by the action of ultraviolet light on 7-dehydrocholesterolin the skin to form Vitamin

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D3 (Cholecalciferol). Ergocalciferol (Vitamin D2) is found in plants, and is produced when ergosterol is exposed to ultraviolet light. Dietary Vitamin D2is ergocalciferol- the major source being fish, and some fortified margarines. Vitamin D is white crystalline solid, freely soluble in oils and fats. Vitamin D is stored in the liver.

Metabolism

Both vitamin D2 and Vitamin D3 undergo similar metabolic changes in the body. In the food dietary vitamin D is absorbed along with fat from the jejunum and ileum. For effective absorption, bile is essential. It is transported in the chylomicrons through the lymph circulation. Vitamin D produced in the skin enters the blood and circulates attached to specific globulin. In most individuals the endogenous synthesis is the major source of vitamin D.

Function

1. Necessary for absorption of calcium and phosphorus by the body.
2. These minerals are needed for formation of bone and teeth.

Deficiency

Deficiency leads to inadequate absorption of calcium and phosphors and further faculty mineralization of bone and tooth structure. Decreased synthesis or dietary deficiency causes rickets in children and osteomalacia in adults. Low serum calcium also cause tetany.

Recommended Dietary Allowance

By exposure to sunlight adequate vitamin D can be synthesized in the body. Therapeutic supplementation is necessary (10ğ) in case of deficiency due to metabolic or genetic reasons.

Dietary Sources

Good source of vitamin D are exposure to sunlight, fish liver oil. Other animals foods such as egg yolk, liver and fish like herring, tuna and sardines have small amounts of vitamin.

Vitamin K / Naphthaquinones

Vitamin comprises of compounds derived from menadione (2methyl-1, 4 naphthaquinone). It exists in two forms in nature; vitamin K1- phylloquinone or phytlmenaquinone and K2 -menaquinone or multiprenylmenoquinone. K1 is present in various green leafy vegetables like spinach and K2 in gastrointestinal tract of human and some animals as it can be synthesized in bowel by microorganism. These both are fat soluble, heat stable vitamin, but are unstable to strong acid, alkali, sunlight and oxidation.

Metabolism

In the presence of bite salts Vitamin K is readily absorbed along with fats in the upper small intestine and is transported to liver in the chylomicrons.

Function

1. The main function is in the formation of a number of coagulation factors like prothrombin factor II, VII, IX and X.
2. Some studies have suggested the role of vitamin K and D on bone mineral density/ bone health.

Deficiency

The dietary deficiency is usually unlikely, but the deficiency may occur due to interference with the absorption or synthesis. The deficiency leads to an increase in the prothrombin time and thus an increased risk of hemorrhage.

Recommended Dietary Allowance

Due to the variation in intestinal synthesis, no dietary allowances have been recommended. Still 'safe intake' advised for adults is 1-2 µg/kg Body Weight/day and 10µg/day for infants.

Dietary sources

Green leafy vegetables are good sources of vitamins K, though the absorption is relatively poor as it is bound to membrane of the chloroplasts. Some plant derived oils such as Soya and Canola oils are also rich in vitamin K. Further research is still required to find the bioavailability and bioactivity of Vitamin K form in different food sources.

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Water-Soluble B Group Vitamins

These groups of vitamins are important in the metabolism of carbohydrates, proteins and fats. Thiamine is referred to as B1 and the other B2 include riboflavin, nicotinic acid, pantothenic acid, pyridoxine, folic acid, Vitamin B12, biotin, choline and inositol. In human nutrition, the first seven (of B2 Vitamin) are of importance whereas the last two are important in nutrition of animal, poultry and microbes

Thiamine / Vitamin B1

The thiamine molecule has an amino and a hydroxyl group. Thiamin hydrochloride is water soluble, heat labile white crystalline substance. It is destroyed by heat in neutral and alkaline solutions but is resistant to heat in acids solutions.

Metabolism

In food thiamin is available either in the free form or bound as thiamin pyrophosphate or bound with protein. Mainly the absorption takes place in the duodenum. It is not stored by the body; hence an adequate and regular supply is required.

Function

1. The principle active form is thiamin pyrophosphate (TPP). It acts as a co-enzyme in the carboxylation and transamination reactions in carbohydrate, protein and fat metabolism.
2. Is essential for a number of important enzyme systems used for release of energy from food.
3. It affects the function of nerve cell membranes.

Deficiency

Thiamin deficiency known as beriberi may occur either due to poor dietary intake (use of highly milled cereals only)or due to gastrointestinal disturbances like vomiting, diarrhea etc. Two deficiency forms termed as 'Dry' and 'Wet' BeriBeri are seen in adults. The deficiency in infants is called 'infantile Beri Beri'. The deficiency symptoms are loss of appetite, muscular weakness, peripheral neuritis (Dry Beri Beri); fatigues, dizziness, breathlessness, enlargement of heart, heart failure (Wet Beri Beri).

It has been observed that various vitamins B deficiencies overlap. Hence a mixture of B-complex is given in deficient states. Only in specific deficiency, a single large dose of vitamins is advised.

Recommended Dietary Allowances

The requirement is based on the total energy requirement, composition of diet and cooking losses. The Recommended Dietary Allowances is 0.5 mg thiamin per 1000 kcal of diet.

Dietary sources

The richest sources of thiamin are Wheat germ and Brewer's yeast. Dry beans, peas, soybeans, peanuts and egg yolk and liver are also good sources. Unmilled cereals and pulses contain high amount of thiamin whereas highly polished cereals like rice are poor source of thiamin.

Retention of food value

Thiamin being water soluble, it is observed that considerable losses occur if water is thrown in which food is cooked. The losses are reduced if the amount of cooking water and total cooking time is reduced. Edible soda / making the cooking medium alkaline should be avoided. 25% of thiamin loss is observed during roasting of foods.

Riboflavin

Riboflavin molecule is a heterocyclic ring of carbon and nitrogen atoms. It is an odorless, orange yellow, bitter tasting compound, sparingly soluble in water. It is resistant to heat, oxidizing agents and acids. It is sensitive to light.

Metabolism

It is absorbed in the small intestine.

Functions

1. It is a component of two major coenzymes Riboflavin Mononucleotide (FMN) and Flavin Adenine Dinucleotide (FAD) that are part of Krebs' energy cycle reactions.

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2. It is also a constituent of enzymes and amino acid oxidases required for oxidation of purines and amino acids.

Deficiency

Riboflavin deficiency (Ariboflavinosis) has symptoms of glossitis (soreness of tongue) dermatitis (especially in scrotal regions and seborrheic dermatitis), chielosis (cracking of lips), angular stomatitis and increased sensitivity of the eyes to light, itching and soreness of eyes. Riboflavin deficiency is highly prevalent especially among children and women in India.

Recommended dietary allowances

Riboflavin has a major role in the energy cycles reactions, thus the requirements are based on the total energy requirements and basal metabolic rate. Keeping in view, the high cooking losses an intake of 0.6 mg riboflavin per 1000 kcal is recommended for adults.

Dietary sources

It is widely distributed in various foods with highest concentration in liver, dried yeast, skimmed milk powder. Other good sources are green leafy vegetables, fresh milk, eggs, meat, and fish. Millets and legumes are fair sources. Milled cereals and its products, other vegetables, roots and tubers are average sources of riboflavin.

Losses during cooking.There is not much loss in usual cooking process as riboflavin is sparingly soluble is water. But addition of soda to vegetables; pasteurization, evaporation and drying of milk; stewing, roasting of meat causes some riboflavin losses in the range of 10-25%.

Niacin (Nicotinic Acid)

Niacin is present in two forms- a pyridine carboxylic acid nicotinic acid and its amide nicotinamide (niacinamide). These are water soluble and resistant to acids, bases, light or heat.

Metabolism: The absorption takes places in the small intestine. In humans, tryptophan from the diet can be converted to niacin (60 mg of tryptophan=1 mg niacin).

Functions

1. It is a part of coenzymes nicotinamide adenine dinucleotide (NAD) and nicotinamide adenine dinucleotide phosphate (NADP) which is part of krebs cycles, fatty acids and cholesterol metabolism.
2. It is required for conversion of phenylalanine to tyrosine.

Deficiency

Niacin deficiency results in pellagra- a condition involving gastrointestinal tract, nervous system, and skin. It is characterized by classical three D's- dermatitis, diarrhea, and dementia. Deficiency is observed in exclusive maize eating population as in Mexico and jowar eating population of southern India. It is due to bound form of nicotinic acid and due to imbalance of amino acids present.

Recommended dietary allowances

6.6 mg niacin equivalent per 1000 kcal has been recommended for all ages.

Dietary sources-The best sources are animal products like kidney, tuna fish, liver and brewer's yeast. Other animal foods like meat and poultry and vegetable sources like whole cereals, pulses, nuts (especially groundnut) are good sources. Milk, though low in niacin is a rich source of tryptophan.

Losses during cooking and processing may occur during boiling, as the vitamin is water-soluble. Reducing the amount of cooking water could reduce loss.

Pyridoxine (Vitamins B6)

Name represents group of three pyridine derivatives. In animal products, it is present as pyridoxal and pyridoxamine; in vegetable products, it is present as pyridoxine. They are all interchangeable in the body.

Metabolism

Similar to other B-vitamins, it is absorbed in the small intestine and not stored in the body Pyridoxal phosphate is the active form of vitamin B6.

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Function

1. It acts as a co-enzyme in the amino acids metabolism, catalyzes conversion of tryptophan to niacin, required for glycogen breakdown
2. Required for formation of antibodies, synthesis of hemoglobin molecule
3. Required in important chemical reactions in nervous system.

Deficiency-

Some of the symptoms of vitamin B6 deficiency observed are anemia, skin lesion, glossitis, cheilosis, and seizures and reduced antibody production. However it is rarely observed as it is present in number of foods. Pellagra is also known to develop in tuberculosis patients receiving isoniazid medication as this depletes the coenzyme required for conversion of tryptophan to NAD.

Recommended dietary allowances

Though the requirements for Indians have not been established, an average dietary recommendation for adults is 1.5mg/day.

Dietary sources

It is present in a number of food products such as dried yeast, wheat germ, whole cereals, legumes, oil seeds, nuts, milk, egg, meat, liver, fish and green leafy vegetables.

Pantothenic acid

It is pale yellow oil with structure- OHCH2C(CH3) 2CHOHCONHCH2CH2CO OH. It is soluble in water, destroyed by acid, alkali and heating.

Metabolism

It is absorbed in the gastrointestinal tract by intestinal cells and enters the circulation.

Function

It is part of two important coenzymes- Co A (coenzymes A) and ACP (Acyl carrier protein) which are part of the carbohydrate and fat metabolism.

Deficiency

On being food with antagonist various deficiency symptoms may occur such as loss of appetite, abdominal pain, peripheral neuritis, fatigue, weakness, insomnia and respiratory infections.

Recommended dietary allowance

The safe and adequate daily intake of 4-7 mg for adults has been recommended.

Dietary sources

It is present in number of plant and animal tissues. Animal sources like liver, yeast; egg yolk and meat are good sources of pantothenic acid.

The vitamin loss during milling and dry processing is about 50%.

Biotin

It is a cyclic urea derivative, stable to heat, light and acids. It is usually combined with proteins in the food and in tissues.

Metabolism

The dietary vitamin is absorbed by the intestinal cells. In addition, intestinal bacteria produce biotin in the gastrointestinal tract.

Function

It acts as a coenzyme in the synthesis of fatty acids and purines.

Deficiency

Due to its wide food availability, deficiency is rare.

Recommended dietary allowances

The recommended dietary allowance has not been established. The safe estimated intake for adults is 100-200mg/day.

Dietary Sources

Nuts and legumes, organ meats & egg yolk are good sources.

Cobalamin/Vitamin B12

Vitamin B12 is a large molecule (C63H90O14 N14PCo) having cobalt as part of its structure. It

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is a deep red crystalline substance. It is stable to heat and only slightly soluble in water. When in the form of a solution, it is destroyed by sunlight.

Metabolism

Vitamin B12, is absorbed in the small intestine requiring an intrinsic factor secreted by the stomach and is transported in blood circulation bound to a protein.

Functions

1. It forms part of coenzymes of some important metabolic reactions like synthesis of DNA, methionine and choline.
2. For the metabolism of folic acid.
3. Along with folate and iron, required for formation of red blood cells.
4. Required for maturation of cells.
5. Involved in formation of mylelin sheath surrounding the nerve fiber.

Deficiency

The deficiency results in a condition called pernicious anemia. The mature red blood cells (RBC) are not produced by the bone marrow and thus the capacity to carry oxygen by the hemoglobin is reduced. Dietary deficiency is usually observed in persons who do not consume any animal food. In addition, the deficiency is also seen in persons to lacking intrinsic factor, which is required for absorption. This is observed in cases of mal-absorption syndrome and in cases of surgical removal of part of the stomach.

Recommended dietary allowances

It is required by the body in minute amounts. The daily allowance of 1 ğ/day has been recommended for adults.

Dietary sources

Vitamin B12 is present only in animal foods (e.g. liver, meat, fish, kidney, brain & egg) and is not present in foods of vegetable origin. Bacteria in the gastrointestinal tract also synthesize Vitamin B12.

Folic Acid

The generic name for folic acid is Folacin. It is a yellow crystalline substance, slightly soluble in water and stable in heat at neutral pH.

Metabolism

The absorption is mainly from the small intestine is mainly stored in the liver.

Function

1. Along with vitamin B12, it is essential for DNA synthesize and for RBC's formation.
2. It has been observed that if folate supplementations are given before preconception, the incidence of neural tube defects is reduced.
3. It has been recently recognized that chronic mild hyperhomocysteinemia is a major risk factor for vascular disease and these respond to increased folate intake. It is yet to be confirmed if higher folate intake has a positive effect on vascular disease incidence.

Deficiency

The deficiency of folic acid cause megaloblastic or macrocytic anemia, resulting from inadequate dietary intake or secondary to diseases like malabsorption syndromes or during pregnancy when the high requirements are not met with. The symptoms of this anemia are- reduction in number of RBC's, immature large nucleated cells, low hemoglobin, low leukocyte and platelet levels. Medicinal supplements are recommended in such cases.

Recommended dietary allowances

Based on various studies, the recommended dietary allowances has been fixed at 100 mg/day for adults, with an additional intake of 300 mg for pregnant women and 50 mg for lactating women.

Dietary sources

It is present in a number of both animal and plant food stuffs like liver, kidney, yeast and deep green leafy vegetables and pulses.

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Toxicity

No folate toxicity has been reported on high folate intake.

Ascorbic acid (Vitamin C)

Ascorbic acid or vitamin C is a water soluble white crystalline compound ($C_6H_8O_6$). The molecule does not contain a free carboxyl group and is a lactone. Lactones behave like acids. Ascorbic acid has a sharp taste usually associated with acids and will form salts. It is optically active and is dextrorotatry. It is a good strong reducing agent and gets easily oxidized. It is one of the unstable nutrients and is easily destroyed by atmospheric oxidation, exposure to light or high temperatures, alkalinity and metal ions especially copper. The rate of oxidation is reduced in weak acid solution and at low temperatures.

Metabolism

The vitamin is rapidly absorbed from gastrointestinal tract, with very little storage. As humans lack the enzymes required for its synthesis, it has to be provided in diet.

Functions

1. Ascorbic acid is easily oxidized. It is able to protect other substances from oxidation; acting as an antioxidant. Synthetic ascorbic acid & its sodium and calcium salts are used as permitted antioxidants in food industry.
2. In body tissues, ascorbic acid protects the easily oxidizable nutrients. It is effective in 'mopping up' free radicals. It has a preventive function for diseases in which free radicals are involved.
3. It helps in absorption of dietary iron.
4. Is involved in collagen (intercellular connecting protein) synthesis, formation of bone and teeth calcification & many other reactions.

Deficiency

Vitamin deficiency results in a condition called scurvy-characterized by weakness, bleeding gums and defective bone growth.

Recommended Dietary Allowances

The recommended dietary allowance is 40mg/day for adults; 25mg/day for infants and 80 mg/day for lactating women.

Dietary Sources

Ascorbic acid occurs in mainly in foods of plant origin, especially fruits and vegetables. Fresh green vegetables and salad vegetables like cabbage, lettuce, spinach, amaranth and cucumber contain this vitamin. The citrus fruits (lemons and oranges), berries and melons are particularly rich in the vitamin. Tomatoes and potatoes also contain good amount. Gooseberry (Amla) is one of the richest sources of this vitamin. Storage causes decrease in the vitamin C content. Germinated grains have a higher vitamin C thannonsprouted cereal and legumes e.g. Sprouted green gram. Amongst fruits, gooseberry (amla) and Guava are very rich sources of vitamin C.

During cooking, around 75% of ascorbic acid is lost. It is advised that a minimum amount of water should be used for cooking vegetable. It is best to place the vegetables in boiling water as this contains no dissolved oxygen. Addition of soda bicarbonate (alkaline condition) should be avoided. Heating or drying leads to Vitamin C destruction but gooseberry (Amla) is an exception.

Minerals

Minerals are required for many purposes like forming the frame and rigid structure of the body, as part of the body/cell fluids and for number of cellular and sub cellular physiological functions.

Calcium

Most of the calcium in the body is present in the bones and teeth; only a small amount (1%) is present in blood/body fluids. It is present either is combination with protein or as calcium ion. Thyroid and parathyroid hormones maintain the concentration of calcium in blood. During dietary deficiency, the calcium present in the bones maintains the blood calcium levels.

Metabolism

The dietary calcium absorption is only 20-30%.

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The dietary absorption depends on many factors e.g. vitamin D levels, any renal insufficiency, hypothyroidism and interaction with other diet components like phytates (present in cereals) and oxalates (present in amaranth, horse gram, gingelly seeds, tea coffee). The availability of calcium is reduced as it binds to form insoluble calcium phytate/oxalate. The calcium absorption across the intestinal mucosa is by both active and passive transport.

Function

1. Calcium is required for blood clotting;
2. For contraction of the muscles (e.g. contraction of heart) and
3. For many enzymatic activities.

Deficiency

Calcium loss leads to a condition is known as osteoporosis. In this condition, due to loss of calcium, bone becomes fragile and brittle and fracture easily. This is often found in postmenopausal women. Achievement of high bone mass through good nutrition and exercise during period of growth is beneficial.

Recommended Dietary Allowances

The requirement varies based on the age, sex and physiological conditions (e.g. growing children, pregnancy or lactating women). It varies from 400-1000mg per day. If dietary calcium sources are insufficient, the calcium required is taken from bones.

Dietary Sources

Calcium is present in both the plant and animal foods. Foods of animal sources are milk and fish (bhekti, chingri, rohuetc). Among vegetable sources, green leafy vegetables like amaranth, drumstick and fenugreek leaves are the richest sources of calcium. Amongst cereals/millets and pulses, ragi (millet); soybean and rajmah have high calcium content than other cereals & pulses. Nuts (almonds) and oilseeds (gingelly& mustard seeds) are also good calcium sources.

Iron

It is the major component of pigment hemoglobin in red blood cells, (which is essential for the transportation of oxygen; accounting for approximately 0.1% mineral content in the body. Iron, to a smaller extent, is also present in muscle as myoglobin (muscle protein) and as cell enzymes (cytochromes). Rest is stored in the liver, spleen and bone marrow (as iron binding protein- ferritin and hemosiderin).

Metabolism-

The absorption of dietary iron by the body is small. Many factors affect rate of absorption-such as source of iron, presence of vitamin C in the diet. The bioavailability of iron varies depending on the kind of diets i.e. iron present in animal products (haem iron) is more readily absorbed than non-haem iron present in plants. Presence of ascorbic acid in the diet also promotes absorption (it reduces ferric ion to the absorbable ferrous state).

Function-

Iron is a major component of pigment hemoglobin in red blood cells

Deficiency-

With a prolonged iron deficiency, the hemoglobin falls below normal and the condition is known as anaemia. Iron deficiency anemia is an important nutritional problem in our country. It is observed that women especially pregnant women (60-70%) and children are suffering from iron deficiency anemia. Different factors contribute to it -poor iron absorption from our diets, various worm infestations and blood losses. For prevention and correction of anemia, haematinics (medicinal iron) are provided especially to pregnant women for their high requirements.

Recommended Dietary Allowances-

Due to the low absorption rate of iron from composite cereal based diet (approximately2-5% only); the recommendation for daily allowance is 28-38mg for adults.

Dietary Sources-

Green leafy vegetables (amaranth, colocasia leaves, mustard leaves, pulses like soybean lentil,

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cow pea, roasted Bengal gram, cereals and millets (bajra, rice flakes) are rich sources of iron. Among animal products, liver is a rich dietary source.

Iodine

It is the heaviest member of the halogen group, occurring as salts in nature especially in seawater. The body has approximately 20-50mg iodine.

Metabolism

It is present as iodide in blood and is absorbed in the thyroid gland (as hormones thyroxin and tri-iodothyronine).

Function

Thyroxin and tri-iodothyronine are important hormones for :

1. Body's metabolic activity,
2. Energy production in cells.

Deficiency

Iodine deficiency disorder (IDD) is a major public health problem in our country. If dietary deficiency occurs, the thyroid gland increases in size to compensate for the deficiency (known as goiter). Goiter occurs in many parts of the world especially in areas where iodine level of soil are low. This affects the level of the iodine in vegetation. Some vegetables if consumed in large quantities especially cabbage and cauliflower of brassica family interferes with the uptake of iodine by the thyroid gland thus causing goitre.

Iodine deficiency during the pregnancy affects the fetus and may lead to mental and growth retardation in later life. One of the ways of controlling IDD is the use of 'iodized salt'. This is prepared by adding potassium iodide (30ppm) to the salt.

Recommended Dietary Allowances

The daily requirement is reported to be 0.15mg.

Dietary Sources

Sea foods are the richest sources-like cod, salmon herring, and cod liver oil. Some iodine is also found in drinking water.

Fluorine

Fluorine is most abundant element in nature. Being so highly reactive, it is never found in its elemental gaseous form, but only in combined form. About 96 per cent of fluorine in the body is found in bones and teeth. Fluorine is essential for normal mineralization of bones and formation of dental enamel.

Sources

The principal sources of fluorine available to man are :

a. Drinking water- the major source of fluorine to man is drinking water. In most parts of India, the fluoride content of drinking water is about 0.5 mg/L, but in fluorosis-endemic areas, it may be as high as 3 to 12 mg/L.
b. Foods- fluoride occurs in trance in many foods, but some foods such as sea fish, cheese and tea are reported to rich in fluorides.

Deficiency

Fluorine is often called a two edged sword. Prolonged ingestion of fluorides through drinking water in excess of the daily requirement is associated with dental and skeletal fluorosis; and inadequate intake with dental caries. The use of fluoride is recognized as the most effective means available for the prevention of dental caries.

Requirements

The recommended level of fluorides in drinking water in India is accepted as 0.5 to 0.8 mg per litre. In temperate countries where the water intake low, the optimum level of fluoride in drinking water is accepted as 1 to 2 mg per litre.

Syllabus- Definition of Balanced diet and diet for an individual depending on age, body weight and physiological status and Social Aspects of Nutrition.

Learning objectives- Define Balanced diet and explain diet for an individual depending on age, body weight and physiological status and explain the Social Aspects of Nutrition

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Definition of Balanced Diet and Diet for an Individual Depending on Age, Body Weight and Physiological Status and Social Aspects of Nutrition

'Balanced diet' is defined the kinds of food on which a person or group lives. A balanced diet is defined as one which contains a variety of food in such quantities and proportions that the need for energy, amino acids, vitamins, minerals, fats, carbohydrates and other nutrients is adequately met for maintaining health, vitality and general wellbeing and also makes a small provision for extra nutrients to withstand short duration of leanness. Since all foods don't have similar nutritional quality, the nutrients provided and thus the health depends on the choice & quantity of foods selected. For a healthy & active life, diets should be planned on sound nutritional principles.

Thus, while planning the diet, in addition to the calorific value, the quantity and quality of food is taken into consideration. The three proximate principles of food are Protein, Carbohydrate and Fat. The main energy food sources are carbohydrate and fats; whereas for growth and development protein food sources are required. Deficiency, excess or imbalance of nutrients results in malnutrition, which could be either under nutrition or over nutrition. Proper nutrition is required for prevention of illness as well as for treatment of the illness. A combination of different foods is required to be included in the diet as no single food meets all the nutrient requirements. For convenience in planning of a meal, different foods have been grouped based on their function and major nutrient contribution. These are:

1. Milk and its products
2. Meat/Poultry
3. Cereal
4. Pulses/Legumes;
5. Fruits
6. Vegetables;
7. Fats & Sugar

Though there are number of factors affecting the health of an individual: diet is an important component. Nutrients provided to our body by a balanced diet helps in proper growth and development. One of the fundamental basic requirements for health is good nutrition as it not only promotes growth and development but also provides immune competence and affects cognitive development. Studies have indicated that kind of nutrition in early life (especially intrauterine and infancy) affects disease processes in adult life. With the changing lifestyle modifications in the world, including a change in the quantity and quality of food supply & intake; nutrition is emerging as an important tool for promoting health and for prevention/reducing the risk of many diseases.

Basic food groups

There is no single food providing all essential nutrients in sufficient amounts. Different foods provide different nutrients, requiring us to select a variety of foods so as to provide a balanced satisfactory diet. Quantitatively and qualitatively; the kind of diet/food we consume is important for our health and wellbeing. Conveniently, foods are grouped as-

1. Cereals, Millets and pulses
2. Vegetables and fruits
3. Milk and milk products, egg, meat and fish
4. Oils & fats and nuts & oilseeds

They are also classified according to their functions

1. **Energy Foods :** Carbohydrate and fat rich foods mainly contribute energy in our diet. The carbohydrate rich foods are cereals, sugars, and starchy vegetables. The fat rich foods are oils, nuts and butter etc. In addition to energy, cereals also provide B-group of vitamins and several minerals. The fats and sugars add palatability to the diet.
2. **Body Building Foods -** Body building foods are mainly protein rich foods such as milk & its products, egg, meat, fish, poultry (animal sources); pulses, legumes and nuts (plant sources). In addition, these foods contribute Vitamin A, Vitamin B, minerals and energy.

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The animal proteins contain all essential amino acids and have better protein utilization than plant proteins.

3. **Protective Foods** - This group of food consists of mainly of vitamin and mineral rich food sources such as fruits and vegetables (except roots and tubers). Among various fruits and vegetables, orange and deep yellow colored fruits and vegetables are good source of b-carotene; green leafy vegetables are rich in calcium, iron, vitamin C and b-carotene; and citrus fruits are good source of vitamin C.

While selecting food it is also useful to able to compare the nutrient value. One of the simplest ways is through nutrient density. Nutrient density is the amount of nutrient present in relation to a unit of energy. Use of nutrient density concept is helpful in providing high nutrient with smaller size portions in different situations such as requirement as in children & elderly.

Earlier nutrition science has focused on understanding deficiencies thus recommendations were given. Further step was epidemiologic studies showing how diet contributes to risk of certain diseases e.g. fat and cardio vascular disease. The increasing knowledge about micronutrients including vitamins , minerals and other compounds (such as flavones, anthocyans) on a molecular level together with results from epidemiological studies open a new field of nutrition science-neutriceuticals link between nutrition and medicine.

Balanced Diet for Different Sections of People in the Society, Social Aspects of Nutrition

To promote healthy diet, governmental and other official bodies of countries have issued guidelines. National Institute of Nutrition has given the dietary guidelines for Indians for a balanced diet and good health throughout life

Composition of balanced diet

Balanced diet is a diet providing nutrients in the requisite proportions. It has been recommended that a balanced diet provide approximately 60-70% of total calories from carbohydrate source, 10-12%from protein source and 20-25% from fat. In addition, non nutritional nutrients as dietary fiber, antioxidants (such as –b carotene, Vitamin C, E), and phytochemicals (e.g. Polyphenols, flavones etc.) needs to be provided by the balanced diet.

Recommended dietary allowances (RDA) for average Indian

To maintain proper body functions, the body requires different nutrients in varying proportions depending on different factors such as age, sex, activity, body weight and height, physiological conditions (like adolescence, pregnancy or lactation etc).

Recommended Dietary Allowances (RDA) or Intakes (RDI) is defined as "the intake of nutrient derived from diet which keeps nearly all people in good health". While preparing RDA the individual variation and the diet-to-diet variability like bioavailability of nutrients, margin of safety are taken into account. These are optimal requirements for maintaining health and not average or minimum.

The Indian Council of Medical Research (ICMR) expert group has given the nutrient needs and RDA (recommended dietary allowances) for different nutrients for different age groups, for different activities based on the safe allowances as given by Food and Agriculture Organization (FAO) and World Health organization (WHO). These guidelines have been based on the following assumptions:

Reference man and woman

Reference Man is defined as "an adult man between 20-39 years of age, weighing 60kg and height of 163cms. He is free from disease and is physically fit for active work. On each working day, he is employed for eight hours in occupation that usually involves moderate activity. While not at work, he spends eight hours in bed, four to six hours in sitting and moving about and two hours in walking, active recreation or household duties."

Reference Woman is defined as "an adult woman between 20-39 years of age, weighing 50kg and height of 151cms. She may be engaged for eight hours in general household work, in light industry or in any other moderately active work. Apart from eight hours in bed, she spends four to six hours in sitting and moving around (light activity) and two hours in walking, active recreation

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or household duties."

For infants and children national Centre for Health Statistics (NCHS – USA) standards was used.

Energy Allowances

It is based on the equation given by FAO using BMR values derived from body weight. It is reduced by 5 % due to lower BMR for Indians.

Protein Requirement

Based on Indian mixed vegetable diets & considering NPU of 65, the requirement is recommended.

Fat requirement

The minimum EFA requirements and the invisible fat content of a cereal-based diet were also considered.

Minerals

Iron: Based on the levels of absorption in different cereal based diets (rice -5%; mixed cereal-3%; wheat and millet -2%) and on the basal loss, menstrual loss (in women) and growth requirement (in children), the requirements were estimated.

Calcium and Phosphorus: Due to the interrelation between calcium and phosphorus, the desirable ratio Ca: P of 1:5in infants and 1:1 in adults is considered.

Vitamins

Vitamin A: 1mg b carotene =0.25mg retinal. For conversion the following conversion factors are used:

a) Retinol content (mg) = mg Retinol + mg beta-carotene *0.25, if retinol and beta- carotene are expressed in mg.

b) Retinol content (mg) = vitamin A IU * 0.3 + beta-carotene IU * 0.15, if Vitamin A and beta –carotene are given in International Units.

Vitamin B Group: These are related to the energy intake; the recommendation is given per 1000kcal.In case of niacin, contribution of tryptophan is taken into account assuming 60mg dietary tryptophan yields 1mg niacin in the body.

Social aspects of nutrition

Food means not only proteins, fats, minerals, vitamins and other nutrients- but much more; it is part of security and civilization. Nation as and civilization are linked together not only by idea, but also by bread. Hunger and malnutrition are problem everywhere and have harassed mankind and threatened peace throughout history. It is no wonder that the growing incidence of hunger and malnutrition should have come to the forefront of international concern.

Problems of malnutrition

Malnutrition has been defined as "a pathological state resulting from a relative or absolute deficiency or excess of one or more essential nutrients". It comprises four forms under nutrition, over nutrition, imbalance and the specific deficiency.

1. Under nutrition- this is the condition which results when insufficient food is eaten over an extended period of time. In extreme cases, it is called starvation.
2. Over nutrition- this is pathological state resulting from the consumption of excessive quantity of food over an extended period of time. The high incidence of obesity, thermo and diabetes in western societies is attributed to over nutrition.
3. Imbalance- it is the pathological state resulting from a disproportion among essential nutrients with or without the absolute deficiency of any nutrient.
4. Specific deficiency- it is the pathological state resulting from a relative or absolute lack of an individual nutrient.

Ecology of malnutrition

Malnutrition is a man-made disease. It is a disease of human societies. It begins quite commonly in the womb and ends in the grave. The great advantage of looking at malnutrition as a problem in human ecology is that it allow for variety of approaches towards prevention. Ecological factors are as follow:

1. Conditioning influences-infectious diseases are an important conditioning factor responsible for malnutrition, particularly in small children. Diarrhea, intestinal parasites, measles, whooping cough, malaria, tuberculosis all

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contribute to malnutrition.

2. Cultural influence- lack of food is not the only cause of malnutrition. Too often there is starvation in the midst of plenty. People choose poor diets when good ones are available because of cultural influences which vary widely from country to country, and from region to region.
   a. Food habits, customs, beliefs, traditions and attitudes
   b. Religion c. Food fads
   d. Cooking practices
   e. Child rearing practices
   f. Miscellaneous

1. Socio-economic factors- malnutrition is largely the by – product of poverty, ignorance, insufficient education, lack of knowledge regarding the nutritive value of foods, inadequate sanitary environment, large family size, etc.
2. Food production- increased food production should lead to increased food consumption. The average India has 0.6 hectare of land surface compared to 5.8 hectare per head in the developed countries. The per capita arable land for an average Indian is only 0.3 hectare. Yields per hectare are only about one fourth of those achieved in the industrialized countries.
3. Health and other services-the health sector can, if properly organized and given adequate resources can combat malnutrition. Some of the remedial actions that can be taken up by health sectors are:

a) Nutritional surveillance
b) Nutritional rehabilitation
c) Nutritional supplementation etc.

Table- Recommended Dietary Daily Allowances for Indians (Macronutrients and minerals)

Group	Particular body	Weight	Energy	Protein (Gm)	Fat (Gm)	Calcium (mg)	Iron (mg)
Man	Sedentary Moderate Heavy	60	2425 2975 3800	60	20	400	28
Woman	Sedentary Moderate Heavy Pregnancy Lactation 0-6 months 6-12 months	60	1875 2225 2825 500* 550* 400*	50 50 25 18	20 30 45 45	400 1000 1000 1000	30 38 30 30
Infants	0-6 months 6-12 months	5.4 8.6	108/kg 98/kg	2.05/kg 1.65/kg	-	500 500	-
Children	1-3 years 4-6 years 7-9 years	12.2 19 26.9	1240 1690 1950	22 30 41	25	400	12 18 26
Boys Girls	10-12 years 10-12 years	35.4 31.5	2190 1970	54 57	22 22	600 600	34 19
Boys Girls	13-15 years 13-15 years	47.8 46.7	2450 2060	70 65	22 22	600 600	41 28
Boys Girls	16-19 years 16-19 years	57.1 49.9	2640 1060	78 63	22 22	600 600	50 30

*-indicates additional to normal allowance

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Table - Recommended Dietary Daily Allowances for Indians (vitamins)

Group	Particulars	Vit-A	Thia-mine mg	Ribo-flavin mg	Nicoti-nic acid mg	Pyrid-oxine mg	Vit. C mg	Folic acid µg	Vit. B12µg
Man	Sedentary Moderate Heavy	600/ 2400	1.2 1.4 1.6	1.4 1.6 1.9	16 18 21	2.0	40	100	1
Woman	Sedentary Moderate Heavy Pregnancy Lactation 0-6 months 6-12 months	600/ 2400 600/ 2400 950/ 3800	0.9 1.1 1.2 0.2* 0.3* 0.2*	1.1 1.3 1.5 0.2* 0.3* 0.2*	12 14 16 0.2* 4 3	2.0 2.5 2.5 2.5	40 40 80 80	100 100 150 150	1 1 1.5 1.5
Infants	0-6 months 6-12 months	350/ 1200	55 50	65 60	710 650	0.1 0.4	25 25	25 25	0.2 0.2
Children	1-3 years 4-6 years 7-9 years	400/1600 400/1600 600/2400	0.6 0.9 1.0	0.7 1.0 1.2	8 11 13	0.9 0.9 1.6	40	30 40 60	0.2-1.0
Boys Girls	10-12 years 10-12 years	600/2400 600/2400	1.1 1.0	1.3 1.2	16 13	1.6 1.6	40 40	100 100	0.2-1.0 0.2-1.0
Boys Girls	13-15 years 13-15 years	600/2400 600/2400	1.2 1.0	1.5 1.2	16 14	2.0 2.0	40 40	100 100	0.2-1.0 0.2-1.0
Boys Girls	16-19 years 16-19 years	600/2400 600/2400	1.3 1.0	1.6 1.2	17 14	2.0 2.0	40 40	100 100	0.2-1.0 0.2-1.0

*-indicates additional to normal allowance

Vitamin D: No dietary recommendation given as exposure to sunlight provides adequate Vitamin D.

The daily recommended dietary allowances for macronutrients, minerals and vitamins for adult man and woman engaged in different activities and infants and children are tabulated in Table-1 & 2.

Locally available foods : Inexpensive quality foods and foodstuffs rich in more than one nutrient. Man derives nutrients through the food he daily eats. Type and quantity of various foods depend on socio-cultural & economic considerations. Each food in our diets, contain a wider range of nutrient, serves as the major source of one or two nutrients.

Cereals : Millets including ragi are rich in minerals & fiber especially in rice-based diets. Inclusion of some millet in a diet will help in making up deficiency of some of these minerals in the diet & in providing bulk (fiber) to diet.

Pulses : Protein of pulses are of low quality since they are deficient in methionine, but are rich in lysine. These supplement proteins of cereals. The most effective combination to achieve maximum supplementary effect is 4 parts of cereal protein + 1 part of pulse protein. In terms with the grains it will be 8 parts of cereal and 1part of pulses.

Vegetables : Green leafy vegetables (GLV) are rich source of calcium, iron, -carotene and vitamin C, riboflavin & folic acid. These are inexpensive and are advisable to include at least 50g of GLV's in the diet. Some of the important root vegetable like tapioca, potato, sweet potato, carrot, yam, and colocasia are important source of energy, carotene and calcium. Other vegetables add variety to the diet; provide vitamin C, some minerals and dietary fiber.

Milk and milk products : Milk is an important source of good quality protein; in addition it

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provides other nutrients especially calcium and riboflavin.

Eggs : Eggs proteins are considered as standard for evaluating the quality of other proteins. It has the highest nutritive quality as compared with any other dietary protein. They are rich source of all nutrients except ascorbic acid.

Flesh foods : They are rich in good quality protein, vitamin A. (liver) and vitamins B_{12}.

Emphasis on nutritional adequacy

Thus diets could be improved by :

- Replacing single cereal by cereal pulse combination and mixed cereal for improving protein quality.
- For improving vitamin & mineral content at least 50g of green leafy vegetable is included.
- Diets including seasonal inexpensive yellow fruits help and improve vitamin A & C content of be diet.
- Addition of 150 ml of milk to diet can improve protein and calcium content of the diet.
- Addition of at least 10g oil/fat will increase energy and EFA intake.

Syllabus- Food hygiene, Sanitation of eating places, Preservation of food, Food handlers, Foodborne diseases, Food fortification, Food adulteration and Food toxicants.

Learning objectives- Explain Food hygiene, Sanitation of eating places, Preservation of food, Food handlers, Foodborne diseases, Food fortification, Food adulteration, and Food toxicants

Food Hygiene, Sanitation of Eating Places, Preservation of Food, Food Handlers, Foodborne Diseases, Food Fortification, Food Adulteration and Food Toxicants.

Food Hygiene

Apart from diseases due to deficient and excess intake of food, there are diseases due to food contamination by microorganisms that occur during production, storage, transport, cooking or feeding. The primary aim of food hygiene is to prevent food poisoning and other food borne illness.

Food Additives

These are legally permitted 'non-food' substances added to improve the appearance, flavor, texture or storage properties. This also includes those substances that get incorporated into foods in the course of their packing, storage, transportation and handling. Thus, there are two categories of food additives—first and second categories.

First category or direct additives, are those which are deliberately added and they are safe. These include:

1. Colouring agents, e.g. Saffron, turmeric, tartrazine, caramel.
2. Flavouring agents, e.g. vanilla essence, cloves, ginger.
3. Sweetening agents, e.g. saccharin, aspartame.
4. Preservatives, e.g. sorbic acid, sodium benzoate.
5. Palatability agents, e.g. citric acid, benzoic acid, etc.
6. Stabilizing agents, e.g. gum, starch, dextrin, etc.

Second category or Indirect additives are those contaminants incidental through packing, processing-steps or while transportation and they are not safe. For example, pesticides, rodenticides, arsenic, etc. Prohibited additives are lead chromate, metanil yellow, ferric sulfate and copper carbonate. The harmful effects of food additives are allergy, food poisoning, carcinogenicity, etc. Majority of processed food like bread, biscuits, cake, jam, jellies, soft-drinks, ketch-up, etc. all contain food additives. Because of the harmful effects resulting in public health problem, in India, there are two regulations governing the food-additives-namely Prevention of Food Adulteration Act and Fruit Products Order. Any processed food containing the additives more than the permissible limit or that are not permitted, is considered to be adulterated. The

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nature and quantity of the additive must be clearly printed on the label.

Food Preservation

Objectives

1. To preserve the nutritive value
2. To prolong the life of food
3. To add variety to food preparation
4. To make the food available even in off the season
5. To avoid wastage of food
6. To save time in procurement.

Preservation of the food is necessary because food is liable for spoilage due to the action of micro-organisms (moulds, yeast, bacteriae, etc.) insects and enzymes. Moulds which look like cotton spread on food, develop in warm, damp and dark places. For example, Aspergillus flavus on groundnuts produce aflatoxin, consumption of which results in Aflatoxicosis. Yeast grow on fruits and convert the sugar into alcohol and carbon dioxide. Anaerobic bacteriae usually spoil the tinned food and aerobic bacteriae spoil foods like milk, egg, meat, vegetables, etc.

Principles of Food Preservation

1. It is to maintain asepsis and to prevent entry of the organisms, by air-tight package
2. It is to make liquids free from bacteriae by filtration through porcelain-filters
3. It is to destroy enzymes by blanching, e.g. pasteurization of milk
4. It is to destroy pathogens by irradiation of fruits and vegetables, etc.

Methods of Food Preservation- There are two methods—bacteriostatic and bactericidal.

Bacteriostatic methods

- **Dehydration:** For example, removal of moisture from fruits, chillies, preparation of milk powder from milk, etc.
- **Coating (Glazing):** For example, a coat of sodium silicate over the egg, closes the pores and prevents spoilage.
- **Salting:** For example, lemon is best stored by pickling.
- **Chemicals:** For example, benzoic acid is used for food preservation.

Refrigeration (Chilling): For example, keeping the fruits, vegetables, milk, egg, meat, drinks, etc. in the refrigerator, prevents the growth of pathogens. Digestibility and food values are not affected.

Bactericidal methods

- **Heating:** For example, pasteurization of milk. However, spores are resistant to heat.
- **Smoking:** For example, smoking of meat and fish.
- **Canning:** For example, hot food is put inside the can and again heated. Then the can is sealed. This makes the can air-tight.
- **Irradiation:** For example, irradiation with ultraviolet rays for fruits and vegetables.

Food Processing

These methods improve the quality of foods. The different methods are as follows:

1. Parboiling: By this method, the nutrient lost is minimized in the rice.

2. Parching (Puffing): In this method, the cereals (Jowar, rice, maize) are moistened and then heated. While heating the escaping water causes the grain to swell. For example, murmura, popcorn, etc. Starches in the grain are broken down to simpler compounds, which improves their digestibility. It leads to some loss of lysine.

3. Sprouting (Germination): The pulse (green-gram, Bengal gram) grains are moistened and stored in wet condition for 24 to 48 hours. The grains sprout. The process increases vitamin C content by about 10 times. The content of thiamine, riboflavine and niacin is almost doubled. Iron becomes free and hence available. The digestibility increases due to breakdown of cell-walls. Sprouting of fenugreek (methi) seeds reduces its bitter taste.

4. Fermenting: In this method, the micro-organisms multiply under the processing conditions,

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e.g. making curd from milk, processing of rice and urid dal for idli, etc. In curds, the lactose is converted into lactic acid. The enzyme in the starch releases carbon dioxide to cause bubbles. Fermentation doubles the thiamine, riboflavin and niacin contents. Iron availability is also increased.

5. Liming: Means introduction of lime in foods like butter-milk, rasam, fermented mixture. It prevents destruction of thiamine and riboflavine.

Sanitation of Food Establishments (Restaurants, Eating Houses)

The following minimum standards have been suggested under the Model Public Health Act (1955), for restaurants:

Location: It should not be near any accumulation of filth or open drain, stable, manure pit and other sources of nuisance.

Floor: Should be higher than the adjoining land, made with impervious material and easy to keep clean.

Rooms: Should be accommodative for maximum of 10 persons.

Walls: Should be impervious and easily washable.

Lighting and ventilation: Should be adequate.

Kitchen: The floor to be impervious, smooth, non-slippery and easy to keep clean. Door and windows to be rat-proof, flyproof and of self-closing type. There must be smoke pipe and ventilators.

Store room: There must be provision for storing the food grains and also cooked food separately.

Furniture: Should be strong and easy to keep clean and dry.

Collection of refuse: There must be provision for collection, storage and transportation of refuse.

Water supply: Should be of independent source, continuous, adequate and safe.

Washing utensils: There must be provision for washing of the utensils and crockery-followed by disinfection in hot water. Sanitation of food establishments not only depends upon the physical environment of the set-up, but also upon the state of personal hygiene and habits of the food handlers.

They may be carriers of various diseases such as typhoid, diarrheal diseases, dysenteries, enteroviruses, viral hepatitis, amebiasis, ascariasis, strepto and staphylococcal infections. Therefore, the following measures must be taken care of the food-handlers.

Food Handlers

- Preplacement thorough medical examination to exclude the presence or suffering of the systemic disease
- Day to day health appraisal should be made
- They should abstain from their duty whenever they develop septic skin lesions, respiratory and intestinal symptoms, otitis-media, or any other wound till they are cured bacteriologically
- They should undergo periodical medical check-up
- They should take the treatment promptly
- They are educated to maintain a high standard of personal hygiene on the following aspects

Hairs: Use scarfs to prevent falling of the hairs on foods.

Hands: Finger nails should be kept trimmed and free from dirt. Hands to be scrubbed and washed with soap and water before handling the food and after using toilet.

Overalls: Clean and white overalls should be worn by them.

Habits: The hazards of unguarded coughing, sneezing, in the vicinity of the food, smoking in the food premises, etc. must also be told.

Food Borne Diseases

Food borne disease is defined as "A disease, usually either infectious or toxic in nature, caused by agents that enter the body through the ingestion of food." With increase in urbanization, industrialization, tourism and mass catering

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systems, food borne diseases are on the increase throughout the world. Food borne diseases may be classified;

A. Food intoxications-

1. Diseases due to naturally poisoning of food-
   a. Lathyrism
   b. Endemic ascites
2. Due to toxins produced by certain Bacteria-
   a. Botulism
   b. Staphylococcus poisons
3. Due to toxins produced by some fungi
   a. Aflatoxin
   b. Ergot
   c. Fusarium toxins
4. Foodborne chemical poisoning

a. Heavy metals, e.g. mercury (usually in fish), cadmium (in certain shellfish), lead (in canned food)

b. Oils, petroleum derivatives and solvents (trycresyn phosphate)

c. Migrant chemicals from package materials

d. Asbestos

e. Pesticide residues (DDT,BHC)

Food-borne infections

1. **Bacterial diseases-** typhoid fever, paratyphoid fever, salmonellosis, staphylococcal, intoxication, Cl. Perfringens illness, Botulism, B. cereus food poisoning, E. coli diarrhea, non-cholera vibrio illness, streptococcal infection, shigellosis, brucellosis.
2. **Viral diseases-** viral hepatitis, gastroenteritis
3. **Parasites-** Taeniasis Hydatidosis, Trichinosis, Ascarisis, Amoebisis, Oxyuriasis.

Conservation of Nutrients

Before Cooking

- Foods should be kept clean and dry and stored in air-tight containers
- Undermilled or hand pounded rice to be preferably used
- Sprouting of the pulses improves the nutritive value
- Washing of the food item to be done with minimum quantity of water
- Too small cutting and too early cutting of vegetables before cooking to be avoided, to prevent the loss of vitamins and minerals
- Ghee, butter, oil, etc. should be kept sealed in a cool and dry place to prevent rancidity.

During Cooking

- Vegetables are put in the boiling water instead of boiling them in water
- Vegetables should not be cooked for more than 15 minutes
- Baking soda should not be used, because loss of vitamins is more in alkaline medium
- Potatoes and sweet potatoes should be cooked without peeling. It is preferable to cook them in cooker
- Milk should be rapidly brought to boiling point and then cooled quickly, as in pasteurization
- Eggs are best cooked below the boiling point
- Salt should be added late since addition of salt before boiling hastens the loss of nutrients
- Addition of little acid such as tamarind, lemon-juice, vinegar, citric-acid while cooking, conserves the nutrients
- Use of iron knives and cast iron pans increases the iron content
- Steam heating is preferable to use of boiling, because the loss of nutrients is almost nil
- Both shallow and deep frying of foods in oil causes loss of nutrients. Loss is less in deep frying because of the oil coating.

After Cooking

- Repeated reheating is avoided.
- Food to be eaten while it is hot.

Food Fortification

It is a process wherein nutrients are added in small quantities, to the foods, to maintain or to improve the quality of food aimed at prevention and control of some nutritional disorders, as a long-term measure.

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Examples

1. Addition of vitamin A and D to vanaspati and milk (2500 IU of vitamin A and 175 IU of vit D per 100 g)
2. Addition of potassium or sodium iodide to common salt (iodization of salt) for the prevention and control of endemic goiter
3. Addition of iron salts to common salt for the prevention of nutritional anemia
4. Addition of lysine to wheat flour while making bread
5. Twin fortification of common salt with iron and iodine
6. Fluoridation of water for the prevention of dental caries
7. For fortification, the nutrient and the vehicle should fulfill the following criteria:

- The vehicle must be consumed consistently by the community as a part of the regular diet
- The nutrient should not be hazardous
- The nutrient should not undergo any change in taste, smell, appearance or consistency
- The cost of fortification should not be beyond the reach of the people.

Food Adulteration

It consists of large number of practices such as mixing, substitution, removal, concealing the quality, selling decomposed products, misbranding, (giving false labels), addition of toxicants, etc. Food adulteration is a social evil. This is done by the traders because of their greed for money. The disadvantages for the consumer are: (i) he is paying more money for a food stuff of lower quality, (ii) he is at a risk of ill-health, e.g. epidemic dropsy, allergy, gastritis, testicular damage, etc.

Food materials	Common adulterant
Cereals (Rice, wheat)	Stone, sand, grit
Dals (Bengal gram)	Kesari dal (Lathyrism)
Milk	Addition of water, removal of cream, addition ofstarch (water borne disease)
Ghee	Addition of vanaspati
Butter	Starch, animal fat
Turmeric powder	Lead chromate powder (metanil yellow) (leadpoisoning)
Black pepper	Dried seeds of papaya
Chilli powder	Brick powder
Tea leaves	Husk of blackgram, reuse of tea leaves
Coffee seeds	Tamarind seeds
Baking powder	Citric acid
Honey	Sugar, jaggery
Sugar	Chalk
Mustard seeds	Seeds of prickly-poppy (Epidemic dropsy)
Edible oil	Mineral oil
Ice-cream	Starch, cellulose, washing powder
Asafoetida	Resins, gums
Jaggery solution	Honey (or vice-versa)
Coffee powder	Chicory
Non alcoholicbev-erages	Nonpermitted colours, saccharin, dulcin, lead, arsenic, copper, dirt and filth.

Food Toxicants

Lathyrism- Lathyrism is paralyzing disease of humans and animals. In the humans it is referred to as neruolathyrism because affects the nervous system, and in animals as osteolathyrism because the pathological changes occurs in the bones resulting in skeletal deformities.

Neurolathyrism is a crippling disease of the nervous system characterized by grually developing spastic paralysis of lower limbs, occurring mostly in adults consuming the pulse, Lathyrusm sativus in large quantities.

Neurolathyrism is prevalent in parts of Madhya Pradesh, Uttar Pradesh, Bihar and Orissa. It has been reported in Maharashtra, west Bengal, Rajasthan, Assam and Gujarat where the pulse is

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grown. Lathyrism sativus is commonly known as Khesari Dhal. It is known by local names such as Teora dhal, Lak dhal, Batra, Gharas, Matra etc. the toxin present in Lathyrus seeds has been identified as Beta oxalyl amino alanine (BOAA). It has been isolated in crystalline form and is water soluble; is property has been made use of in removing the toxin from pulse by soaking it hot water and rejecting the soak water. studies indicate that there is a blood- brain to this toxin. In order to overcome this barrier, the pulse must be eaten in large amount over a period of time for 2 months or more. The disease affects mainly young men between the ages of 15-45 years.

1. Latent stage- physically stress exhibits ungainly gait, neurological examination shows characteristic physical signs. This stage is considered important from the preventive aspect, since at this stage, if the pulse is withdrawn from the diet, it will result in complete remission of the disease
2. No- stick stage- patients walks with short jerky steps without the aid of stick. A large number of patients are found in this stage.
3. One stick stage- the patient walks with a crossed gait with a tendency to walk on toes. Muscular stiffness makes it necessary to use a stick to maintain of balance.
4. Two stick stage- the symptoms are more severe. Due to excessive bending of knees and crossed legs, the patient needs two crutches for support.
5. Crawler stage- finally the erect posture become impossible as the knee joint cannot support the weight of the body. There is atrophy of the thigh and leg muscles.

Ergot- Unlike Aspergillus, ergot is not a storage fungus, but a field fungus. Food grains such as bajra, rye, sorghum and wheat have tendency to get infested during the flowering stages by the ergot fungus, Claviceps fusifomis. Fungus grows as a blackish mass and the seeds become black and irregular and are harvested along with food grains. Consumption of ergot infested grain leads to ergotism. Sporadic outbreaks of ergot poisoning in human population have been reported from time to time in areas where bajra is consumed as staple. The symptoms are acute but rarely fatal and include nausea, repeated vomiting, giddiness and drowsiness extending sometimes for periods up to 24 to 48 hours after the ingestion of ergoty grain. In chronic cases, painful cramps in limbs and peripheral gangrene due to vasoconstriction of capillaries have been reported.

Aflatoxins - Aflatoxins are a group of mycotoxins produced by certain fungi, Aspergillus flavus and A parasiticus. These fungi infest foodgrains such as groundnut, maize, parboiled rice, sorghum, wheat, rice, cotton seed and tapioca under conditions of improper storage, and produce aflatoxins of which B1 and G1 are the most potent hepatotoxins, in addition to being carcinogenic. The most important factors affecting the formation of the toxin are moisture and temperature. Moisture levels above 16 per cent and temperatures ranging from 11 to 37^{0}C favour toxin formation. Aflatoxicosis is quite a public health problem in India. The latest report (1975) of 400 cases of aflatoxin poisoning including 100 deaths from Banswada and Panchmahal districts of Rajasthan and Gujarat respectively highlight the problem in India. Aflatoxin 8 1 has also been detected in samples of breast milk and urine collected from children suffering from infantile cirrhosis, Attempts are also being made to relate aflatoxin with human liver cirrhosis.

Control and preventive measures: A crucial factor in the prevention of fungal contamination of foodgrains is to ensure their proper storage after drying, Moisture content should be kept below 10 per cent. If the food is contaminated, it must not be consumed. It is also essential to educate the local population on the health hazards of consuming contaminated foodgrains.

Epidemic dropsy

From time to time, outbreaks of "epidemic dropsy" are reported in India. The cause of epidemic dropsy was not known until 1926, when Sarkar ascribed it to the contamination of mustard oil with argemone oil. Lal and Roy (1937) and

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Chopra et.al:, (1939) gave experimental proof of the cause of epidemic dropsy. Mukherji et.al., (1941) isolated a toxic alkaloid, sanguinarine from oil and found out its chemical formula. This toxic substance interferes with the oxidation of pyruvic acid which accumulates in the blood.

The symptoms of epidemic dropsy consist of sudden, non-inflammatory, bilateral swelling of legs, often associated with diarrhoea. Dyspnea, cardiac failure and death may follow. Some patients may develop glaucoma. The disease may occur at all ages except breast-fed infants. The mortality varies from 5-50 per cent.

Endemic ascites- In Kusmi Block of Sarguja district in Madhya Pradesh, during 1973 and again during 1976, an outbreak of rapidly developing ascites and jaundice was reported among the Nagesia tribals. Both the sexes and all the age groups, except infants, were affected. The overall mortality was 40 per cent. Studies conducted by the National Institute of Nutrition, Hyderabad showed that the local population subsist on the millet Panicum miliare (known locally as Gondhli) which gets contaminated with weed seeds of Crotalaria (locally known as Jhunjhunia). On chemical analysis. Jhunjhunia seeds were found to contain pyrrolizidine alkaloids which are hepatotoxins.

The preventive measures comprise educating the people in the affected areas about the disease, deweeding of the Jhunjhunia plants which grow along with the staple, and simple sieving of the millet at the household level to remove the seeds of Jhunjhunia which are considerably smaller than those of the millet.

Fusarium toxins- Fusarium species of field fungi are known to contaminate food crops and pose health hazards to livestock and man. The problem of fusarium contamination of sorghum is believed to be on the increase. Rice is also known to be a good substrate for fusarium. Work is now in progress at the National Institute of Nutrition to isolate, and identify the toxic metabolites produced by fusarium incamatum.

Syllabus- Milk Hygiene, Milk composition, Source of infection for Milk, Milk borne diseases, Clean and Safe milk and Pasteurization of milk Meat Hygiene, Meat inspection, Slaughterhouse and Freshness of fish and egg.

Learning objectives-

1. Explain Milk Hygiene, Milk composition, Source of infection for Milk, Milk borne diseases, Clean and Safe milk and Pasteurization of milk.
2. Explain Meat Hygiene, Meat inspection, Slaughterhouse and Freshness of fish and egg

Milk Hygiene, Milk Composition, Source of Infection for Milk, Milk Borne Diseases, Clean and Safe Milk and Pasteurization of Milk

Milk Hygiene

Milk is an efficient vehicle for a great variety of disease agents. The sources of infection or contamination of milk may be the dairy animal, human handler or the environment e.g. contaminated vessels, polluted water, flies, dust etc.

Milk composition

Milk is the best and most complete of all foods. It is secreted by animals to serve as the sole and wholesome food for their sucking young ones. It is a fine blend of all the nutrients necessary for growth and development of young ones. Thus milk is a good source of proteins, fats, sugars, vitamins and minerals.

Proteins : The chief protein of milk is casein; it occurs in combination with calcium as calcium caseingenate. The other proteins are lactalbumin, lactoblobulin. Animal's milk contains nearly three times as much protein as human milk. Milk proteins contain all essential amino acids. Human milk proteins contain greater amounts of tryptophan and sulphur containing amino acids than animal milk proteins.

Fats : The fat content of milk varies from 3.4

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percent in human milk to 8.8 percent in buffalo milk. Milk fat is good source of retinol and vitamin.

Sugar : The carbohydrate in all milks is lactose or milk sugar. It is found nowhere else in nature. It is less sweet than cane sugar and is readily fermented by lactic acid bacilli. Human milk contains more sugar than animal milks.

Minerals : Milk contain almost all known minerals needed by the body such as calcium, phosphorus, sodium, potassium, magnesium, cobalt, copper, iodine, etc. milk is particularly rich in calcium; it is however a poor source of iron

Vitamins : Milk is a good source of all vitamins except vitamin C.

Source of Infection for Milk and Milk Borne Diseases

Transmissible disease transmitted from infected man to another via contaminated milk either directly by infected or carrier individuals, or indirectly through polluted water, insects, air & dust, milk utensils & equipment, rodents, flies, rations, etc.

A joint FAO/WHO Expert Committee on milk hygiene classified milk -born diseases:

1. Infections of animals that can be transmitted to man

Primary importance–

a. Tuberculosis
b. Brucellosis
c. Streptococcal infections
d. Staphylococcal enterotoxin poisoning
e. Salmonellosis
f. Q Fever

Lesser importance–

b. a. Cowpox
b. Foot and mouth disease
c. Anthrax
d. Leptospirosis
e. Tick-borne encephalitis

2. Infections primary to man that can be transmitted through milk:

a. Typhoid and paratyphoid fevers
b. Shigellosis
c. Cholera
d. Enteropathogenic Escherichicoli (EEC)
e. Non-diarrheal diseases
f. Streptococcal infections
g. Staphylococcal food poisoning
h. Diphtheria
i. Tuberculosis
j. Enteroviruses
k. Viral hepatitis

Prevention of milk-borne diseases: This is done by procuring clean and safe milk through hygienic diary, pasteurization and sterilization.

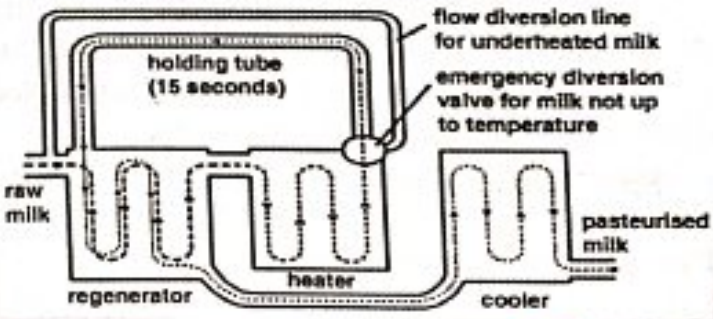
The requirements of a hygienic diary are:

1. Animals should be free from diseases
2. Milking house should be free from dust and flies (clean premises)
3. Milk handlers should be free from communicable diseases and they should maintain a high standard of personal hygiene
4. Wherever possible, milking machines must be used
5. Utensils should be clean; water supply should be clean and safe
6. Bottling, storage and chilling should be done in clean surroundings
7. Facilities must be available for doing laboratory tests of milk.

Clean and Safe Milk

The safety and keeping quality of milk are related to its microbial content. The first essential in the production of clean and safe milk, therefore, is a healthy and clean animal. Milk from a healthy

Pasteurisation using a plate heat exchanger



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udder contains only a few organisms, and these are relatively unimportant. Secondly, the premises where the animal is housed and milked should be sanitary. The milk vessels must be sterile and kept covered. The water supply must be bacteriological safe.

Milk handler must be free from communicable diseases, and before milking they must wash their hands and arms. Where possible, milking machines must be used. Milk should be cooled immediately to below 10°C after it is drawn to retard bacterial growth. In the production of good quality milk, cleanliness of all containers and equipment in which milk is handled is very important.

Pasteurization of Milk

Pasteurization may be defined as the heating of milk to such temperatures and for such periods of time as are required to destroy any pathogens that may be present while causing minimal changes in the composition, flavour and nutritive value (WHO). There are several methods of pasteurization.

1. **Holder (Vat) method-** Milk is kept at 63-66°C for at least 30 minutes, and then quickly cooled to 5°C. Vat method is recommended for small and rural communities.
2. **HTST method** "High Temperature and Short Time Method" -Milk is rapidly heated to a temperature of nearly 72°C, is held at that temperature for not less than 15 seconds, and is then rapidly cooled to 4°C. This is now the most widely method. Very large quantities of milk per hour can be pasteurized by this method.
3. **UHT Method-** Also known as "Ultra High Temperature Method". Milk is rapidly heated usually in 2 stages (the second stage usually being under pressure) to between 125°C, for a few seconds only. It is then rapidly cooled and bottled as quickly as possible.

Sterilization- This is done in milk cookers by heating milk to 100°C (212°F) for 20 to 30 minutes. This process not only destroys 100 percent of pathogens but also spores. This is not a popular method because it diminishes the nutritive value.

Tests for milk: These can be divided into two groups:

1. Tests for adulteration
2. Tests for pasteurization.

Tests for milk adulteration

1. Specific gravity: This should be between 1028 and 1032, under PFA-Act. Low specific gravity indicates addition of water. High specific gravity indicates addition of starch, sugar or skimmed milk powder. Specific gravity is recorded by using lactometer.
2. Fat content: This is estimated with fat-meter. Low fat content indicates addition of water or removal of fat.
3. Iodine test: Few drops of iodine are added to 5 ml of milk. Development of blue colour indicates addition of starch.
4. Cane-sugar: Addition of sugar can be detected by adding hydrochloric acid and few grains of resorcin to test sample and then heated. Development of red colour indicates addition of sugar.

Tests for pasteurization

1. Phosphatase test: This is based on the principle that the enzyme 'Phosphatase' is destroyed when the milk is heated as in pasteurization. To the sample of milk, a buffer 'disodium phenyl phosphate' is added and incubated. If the enzyme is present, it acts upon the buffer and liberates phenol, which is indicated by adding Felin's reagent, which turns the milk blue. Therefore, the development of blue colour indicates that the enzyme is present. Thus, positive test indicates that the milk is not pasteurized or raw milk is added.

2. Methylene blue test: This is to detect the destruction of bacilli. One millilitre of methylene blue is added to 10 ml of milk and incubated in water bath for 5 hours. Discoloration indicates presence of bacteria.

3. Standard plate count: Permissible limit is 30,000 bacteria per ml pasteurized milk.

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4. Coliform count: Coliform organisms are usually completely destroyed by pasteurization. So, they should be zero or absent in any 1 ml of sample of milk. Presence of coliforms is an indication of either of improper pasteurization or post pasteurization contamination.

Meat Hygiene, Meat Inspection, Slaughterhouse and Freshness of Fish and Egg

Meat Hygiene

The term "meat" includes various tissues of animal origin. The diseases which may be transmitted by eating unwholesome meat are,

1. Tape Worm Infestations: Tineasoliu, T. saginata, Trichinellaspiralis and Fasciola hepatica.
2. Bacterial infections: anthrax, actinomycosis, tuberculosis and food poisoning.

Meat Inspection

Animals intended for slaughter are subjected to proper ante mortem and postmortem inspection by qualified veterinary staff. The principal causes of ante mortem rejection of animals are emaciation, exhaustion, pregnancy, sheep-pox, foot-rot, actinomycosis, brucellosis, febrile conditions, diarrhoea and other diseases of an infectious nature rendering meat unfit for human consumption. The main causes of the postmortem rejection are cysticercusbovis, liver fluke, abscesses, sarcocystis, hydatidosis, septicaemia, parasitic and nodular infections of liver and lungs, tuberculosis, cysticercus cellulose, etc. The characteristics of good meat are that it should be neither pale pink nor a deep purple tint, firm and elastic to touch should not be slimy and have an agreeable odour.

Slaughter House

Slaughter house are the places where animals, whose flesh is intended for human consumption, are killed. The hygiene of the slaughter house is of paramount importance to prevent the contamination of meat during the process of dressing.

The following minimum standard for slaughter house.

Location: Preferably away from residential areas.

Structure: Floors and walls up to 3 feet should be impervious and easy to clean.

Walls: It should be covered with tiles or glazed bricks to a sufficient height.

Disposal of wastes: Blood, offal, etc. should not be discharged into public sewers but should be collected separately.

Water Supply: should be independent, adequate and continuous.

Employees: Must be clean and wear clean outer clothes.

Butchers: It should also maintain personal hygiene and be healthy.

Instruments: It used must be sterilized.

Examination of animals: Ante mortem and postmortem examination to be arranged. Animals or meat found unfit for human consumption should be destroyed or denatured.

Storage of meat: Meat should be stored in fly-proof and rat-proof rooms; for overnight storage, the temperature of the room shall be maintained below 5ãC.

Transportation of meat: Meat shall be transported in fly-proof covered vans.

Miscellaneous: animals other than those to be slaughtered should not be allowed inside the shed.

Freshness of Fish

Fish deteriorates or loses its freshness because of autolysis which sets in after death and because of the bacteria with which they become infected. Stale fish should be condemned. The signs of fresh fish:

1. Firm and stiff to touch (not soft or pulpy)
2. When held flat on the hand, the tail should not drop
3. Eyes should be clear and bright (not sunken)
4. Gills should be bright red (n (not muddy or pale)
5. Scales not easily detachable.

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When decomposition begins, body becomes flaccid, blood will run out, on cutting, as a dull red liquid with offensive odour.

Fish is an intermediate host of a tapeworm (Dibothriocephalus latus), being communicated to man. Fish may carry pathogens like vibrio parahemolyticus (resulting in food poisoning), Salmonella species (salmonellosis), Clostridium botulinum type E (botulism). Consumption of certain fish may give rise to 'fish poisoning' and urticaria.

Egg

Although the majority of freshly laid eggs are sterile inside, the shells become contaminated by faecal matter from the hen. Microorganisms including pathogenic Salmonella can penetrate a cracked shell and enter the egg.

Syllabus- Safety and hygiene measures for Fruits and Vegetables.

Learning objectives- Explain safety and hygiene measures for Fruits and Vegetables

Safety and Hygiene Measures for Fruits and Vegetables

Fruits and vegetables constitute another important source for the spread of pathogenic organisms, protozoan and helminths. These infections are a serious menace to public health where sewage is used for growing vegetables. The vegetables which are consumed raw in the form of salads pose a problem in food sanitation. People should be educated to wash the vegetables before eating then raw. Vegetables which are cooked and eaten are free from this danger.

Sanitation of eating places

1. **Location**: Shall not be near filth or open drain, stable, manure pit and other sources of nuisances.
2. **Floors:** To be higher than the adjoining land, made with impervious material and easy to keep clean.
3. **Rooms:**
   - Rooms where meals are served shall not be less than 100 sq. feet and shall provide accommodation for a maximum of 10 persons.
   - Walls up to 3 feet should be smooth, corners to be rounded; should be impervious and easily washable.
   - Lighting and ventilation – ample natural lighting facilities aided by artificial lighting with good circulation of air are necessary.
4. **Kitchen:**
   - Floor space minimum 60 sq. ft.
   - Window opening to be 25 percent of floor area.
   - Floor to be impervious, smooth, easy to keep clean and non-slippery.
   - Doors and windows to be rat-proof, fly-proof, and of the self-closing type.
   - Ventilators 2 percent of the floor area, in addition to smoke pipes.
5. Storage of cooked food: Separate room to be provided. For long storage, control of temperature is necessary.
6. Storage of uncooked foodstuffs. Perishable and non-perishable articles to be kept separately in rat-proof and vermin-proof space; for storage of perishable articles temperature control should be adopted.
7. Furniture: Should be reasonably strong and easy to keep clean and dry.
8. Disposal of refuse: To be collected in covered, impervious bins and disposed of twice a day.
9. Water supply: To be an independent source, adequate, continuous and safe.
10. Washing facilities: To be provided. Cleaning of utensils and crockery to be done in hot water and followed by disinfection.

Syllabus- Formulation of Pathya-Apathya diet for prevention of lifestyle disorders such as Obesity, Diabetes mellitus, cardiovascular diseases and Acid peptic Diseases.

Learning objectives- Formulate a Pathya-Apathya diet for prevention of lifestyle disorders such as Obesity, Diabetes mellitus, cardiovascular diseases and Acid peptic diseases

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Pathya-Apathya

Ayurveda prescribes specific diet patterns in the diseased conditions which are known as Pathya. According to the principles of Ayurveda, derangement of the digestive power (Agni) occurs in many diseases which is the prime reason for the formation of vitiated Dosha, Ama (toxic substances) and malformation of Dhatus (body tissues). Hence it is important to restore normalcy of the digestive power. This objective can be attained by using a properly managed diet regimen according to condition of Doshas and type of the disease.

पथ्यंपथ्योनपेतयद्य चोक्तंमनसः प्रियम ।
यचचाप्रियमपथ्यंचनियत तत्र लक्षयेत ॥

(च.सू. 25/45-46)

The dietary articles and activities that do not adversely affect the body systems and are liked by the mind are regarded as *pathya* (wholesome). Likewise, dietary articles and activities that adversely affect the body system and are disliked by the mind are regarded as unwholesome. This is, however, not a cardinal rule, and food articles and drugs do have a variety of effects depending on the dosage, time, mode of preparation, geographical location, the body constitution of the patient, and dosha.

Hence, the physician who desires success in treatment shall consider effects of the natural properties of drugs and dietary articles, as well as the usage patterns associated with such articles.

In Ayurvedic therapy, this is considered as one of the most important measures during the treatment of disease. One should avoid unsuitable diet and lifestyle during the therapy and must adopt suitable one for faster result and total cure of disease.

Sharangadharaexplains about some Pathya Kalpana like Manda, Peya, Vilepi, Yavagu etc. These Kalpanas are generally used in different diseases according to state of disease and capacity to digest the food in that disease. It also helps to maintain proper Agni (digestive fire) so as to digest food properly and give needed nutrition to tissues of body. It will also help to avoid formation of Ama which is often triggered when Agni (digestive fire) becomes low. Below table explains in short about Pathya Kalpana, their preparation method and uses in therapeutic diet.

Food is of six kinds, Chushya(suckables), Peya (drinks), Lehya (lick able), Bhojya (eatable), Bhakshya (eatables snacks) and Carvya(chewable) each succeeding one harder for digestion than proceeding.

Pathya Kalpana	Method for preparation	Uses
Manda	The filtered liquid portion obtained after boiling one Carminative, Digestive part of rice and fourteen parts of water	Carminative, digestive.
Peya	One part of rice and fourteen parts of water, boiled into Quickly digestible, Stops loose watery consistency	Quickly digestible, stops loose motions, Nourishes the tissues.
Vilepi	One part of rice and four parts of water, cooked into Strengthening, Nourishing, Good for thick paste cious, Diuretic	Strengthening, nourishing, good for heart, Delicious, Diuretic
Yavagu	One part of grain rice etc. and six parts of water, Strengthening, Nourishing cooked into thick paste	Strengthening, nourishing

In Yogaratnakara it is said that for the treatment of diseases aetiology, drug treatment and Pathya are three important factors which should be studied thoroughly before starting the treatment. Judicious planning of treatment by proper understanding of

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these three factors always yields a successful eradication of disease. Yogaratnakara uses the metaphor of Ankura (seedling) is used for progressive form of disease. This Ankura will dry and be destroyed if it is not nourished by water; similarly disease will be destroyed if a patient does not consume Apathya Ahara.

In all diseases Apathya should be avoided because Apathya is predisposing factor for various diseases and helps in fast progression of patho-physiology. As climbers and plants grow in rainy season similarly diseases will increase due to Apathyas. Only Pathya also can cure diseases but one who does not follow Pathya cannot be cured by the use of hundreds of drugs.

Bhela Samhita also explains about merits of Pathya and demerits of Apathya in the Sutrasthana. Pathya Ahara nourishes all Dhatus and Srotasa leading to complete nutrition of body. Pathya Ahara also helps to detoxify the body by getting rid of vitiated dosha. Contrary to this, Apathya Ahara helps in vitiation of Vata etc. doshas. Hence for maintenance of health and treating diseases Pathya Ahara should be consumed.

All these benefits of Pathya Ahara can be ripped off with the help of Kritanna Varga described in various ancient texts. Properties of these Kritanna differ from each other depending upon the method of preparation even if material used is the same. In case of Manda, Peya, Yavagu and Vilepi, the amount of water used for cooking and then amount of liquid and solid content is different for each of them. This determines qualities like heaviness or lightness of food for digestion etc. If all the Kritanna Varga is used judiciously along with the Pathya Ahara then it will help to treat and nourish patient effectively.

These Pathya Ahara are described specific to a particular disease condition as well as there are some Pathya mentioned which can be followed regularly for healthy individuals irrespective of disease condition. According to Bhavaprakasha taking ginger and salt before food is always good and it enhances Agni. Taste, clears tongue and throat. Charaka and Vagbhata also describe some regularly consumable food articles. RaktaShali, Mudga, rain water, Saindhava (rock salt), Jivanti, meat of Aina, Godha, Rohita Matsya, cow's ghee, cow's milk, Tila Taila, ginger, grapes, pomegranate and sugar are considered as most conducive among food articles. Disease specific Pathya (wholesome diet) and Apathya (unwholesome diet) are explained in various classical texts like Charaka Samhita, Sushruta Samhita, Ashtanga Hridaya etc. but there are detailed descriptions about them in other texts like, Sharangdhara Samhita, Pathyapathya Vibodhika, Bhaishajyaratnavali and Chakradatta etc.

Ahara	Properties	Used in disorders
Dugdha	Madhur, Dhatuvardhak, Kaphakara, Vatpittaghna	Raktapitta, Mutrakruccha.
Takra	Amla, Vatkaphaghna, Dipana	Arsha, pandu
Ghruta	Sneha, Vranaghna, Pittaghna	Karnaroga, Shiroroga
Madhu	Madhur, Lekhan, Kaphaghna	Kasa, Shwasa
Tail	Snigdha, Vataghna	Skin disorders, Vatagata rogas.
Lavana	Pachak, Rochanam, vataghna	Malavastambha, adhmana

Vihara-

Walking, travelling, exercise, control on emotions, suppressing urges, sleeping time in this way, according to properties of Ahara and Vihara, we can maintain the equilibrium od Dosha, Dhatu and Mala to treat and prevent diseases.

Formulation of Pathya-Apathya diet for prevention of lifestyle disorders such as Obesity, Diabetes mellitus, cardiovascular diseases and Acid peptic Diseases.

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Pathya (Do's) Apathya (Don'ts) in Obesity-Reference Pathyapathya Vinirnaya

	Pathya (Do's)	Apathya (Don'ts)
Cereals	Prana Shali (Old Shali rice), Sanvaka, Kodrava, Bajara, maze (Makka), Yava (barley)	Newly harvested Shali rice, wheat
Pulses	Mudga, Chickpea (Cana), pigeon pea (Arahara), Kulattha, Kodrava	Black gram (Masha)
Fruits & vegetables	Brinjal, Paravala, Shigru (drum stick)	Potato
Others	Butter milk, cardamom, Amalaki, mustard oil, luke warm water, Priyangu, Guggulu, Lauhabhasma, Shilajatu, intake of water before meal, food substances with pungent, bitter and astringent taste	Paya (Milk), Dadhi (curd), Mamsa (meet), Matsya (fish), clarified butter, Guada (Jaggery), intake of water after meal
Life style	Lekhana Basti, Vamana, Virechana, Physical exercise, night awakening, worry, Udwartana (massage with medicated paste/powder), Atapa Sevana (sunlight exposure), walking, Apatarpana Ahara, Vyayama (exercise), Snana (bathing with luke warm water)	Bathing with cold water, Divaswapna (day sleeping), luxurious lifestyle, Abhyanga (oil massage)

Pathya (Do's) Apathya (Don'ts) in Madhumeha (Diabetes mellitus)-Reference Pathyapathya Vinirnaya

	Pathya (Do's)	Apathya (Don'ts)
Cereals	Kruna Dhanya, Kanguni, Yava, special variety of grain (Sanvaka, Kodrava), Godhuma, Raktashali, Yava (barley),	Freshly harvested grains, rice
Pulses	Mudga, Kulattha, Chanaka, Adhaki, Alasi, Masura and all millets	Black gram (Masha)
Fruits & vegetables	Tikta Rasa Shaka, Shigru, Patola, Karavellaka, Rasona, Apakvakadali Phala, Amalaki, Haridra, Kapittha, Maricha.	Sweet potato, sweet fruits and vegetables.
Others	Madhu (Honey), betel nut, Saindhava Lavana, Mamsa Rasa of pigeon, rabbit, peacock, wild animals and bird, Tila etc.	Pradhana Dravya, Anupa Desha Mamsa, Milk, curd, butter milk, clarified butter, oil, Jaggery, Sura, Saivira, Sukta, Taila, Kshara, Ghrita, alcohol, Sugarcane products, betel, eating before digestion of previous food, incompatible food
Life style	Walking, playing, physical exercise, bathing, Vamana, Virechana, Udawartana	Sukhasana, Dhumrapana, Divaspana (Day sleeping), Swedana (sudation), Mutra Vega Dharana (suppression of natural urges), Raktamokshana (bloodletting), riding, Maithuna (sexual intercourse)

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Pathya (Do's) Apathya (Don'ts) in hypertension / coronary heart disease -Reference Pathyapathya Vinirnaya

	Pathya (Do's)	Apathya (Don'ts)
Cereals	Old Shali rice	Newly harvested rice, Barley, millets etc.
Pulses	Chanaka (Chickpea), Arahara (pigeon pea), Mudga (green gram), Kulattha, Yava,	Black gram (Masha)
Fruits & vegetables	Patola, Karvellaka, Kadali Phala, Purana Kushmanda, Dadima, Mulaka, dry grapes, Rasona, Eranda Taila, Purana Guda, coriander, ginger	Potato
Others	Sandhava Lavana, Jangala Mamsa Rasa, Maricha, cow milk.	Amla Rasa Dravya, Takra, Guru Anna, Taila, Dushitajala, Mesha, Dugdha, Kashaya Amla Rasa Ahara.
Life style	Vamana, Virechana, Laghana, Basti, Swedana, Physical exercise, night awakening, worry, massage with medicated paste/powder (Udwartana), lightening, sunlight exposure, walking, Apatarpana Ahara, exercise, Bathing with luke warm water	Trushna, Chardi, Vega Dharana, Dantadhavana, Raktamokshana, Maithuna, Atibhashya, Chinta, Krodha etc.

Pathya (Do's) Apathya (Don'ts) in Acid peptic Diseases

	Pathya (Do's)	Apathya (Don'ts)
Cereals	Old Shali rice, Yava, Wheat (Godhuma)	Newly harvested rice
Pulses	Mudaga (Green gram), Lentil	Kulattha, Masha
Vegetables	Patola, Vastuka, Karvelak, Carrot, Mint, Spinach, Amla, Bitter gourd, Cabbage, Pumpkin	Mustard leaves, fenugreek, brinjal, gourd
Fruits	Dadima, Kapitha, Amalaki, Kushmanda, Apple, Banana, Sweet Orange, Coconut, Mango, Dates.	Jackfruit, Watermelon, Cashew Fruit, Lime, Pineapple, Plum
Others	Sugar, Honey, Garlic, Dry ginger, Clove, Turmeric, Saffron, Cumin, Beet root, Sweet Potato, Carrot Sheetupchara, Vishram	Fried items, Asafoetida, chilli, Cinnamon, Mustard Seeds, Pepper, Tamarind, Atapa Sewan, Vegadharana, Krodha, Shoka, Chinta, Sleeping after meals in day time

Syllabus- Description of Food safety and standards regulation (Ayurveda Ahara Regulations), 2022 and Food safety and standards Act, 2006.

Learning objective- Describe Food safety and standards regulation (Ayurveda Ahara Regulations), 2022 and Food safety and standards Act, 2006

The Food Safety and Standards (Ayurveda Aahara) Regulations, 2022

With the Central Government's approval, the Food Safety and Standards Authority of India has made amendments to the regulation of the Food Safety and Standard Act, 2006. These regulations will now be called The Food Safety and Standards (Ayurveda Aahara) Regulations, 2022, and it has been published on 5th May 2022 in the Official Gazette. The regulations defines Ayurveda Aahara as food prepared in accordance with the recipes or

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processes as per the method in the authoritative books of Ayurveda listed under 'Schedule A'.

The Food Safety and Standards (Ayurveda Aahara) Regulations, 2021 state the following:

1. Ayurveda Aahara foods to be prepared in accordance with the recipes or ingredients or processes as per method described in the authoritative books of Ayurveda listed under 'Schedule A' only.
2. Ayurveda Aahara are not intended for administration to infants upto 24 months.
3. Food Business Operators shall formulate Ayurveda Aahara in accordance with the categories and requirements specified in Schedule B of the regulations.
4. No person shall add vitamins, minerals and amino acids to Ayurveda Aahara.
5. Schedule C provides List of Additives permitted in Ayurveda Aahara
6. Schedule D provides Microbiological Standards for Ayurevda Aahara and includes Process Hygiene Criteria, Permissible levels of Contaminants
7. The advertisement should follow the Food Safety and Standards (Advertising and Claims) Regulations, 2018.
8. The labelling of Ayurveda Aahara should be according to the Food Safety and Standards (Labelling and Display) Regulations, 2020.
9. Schedule E includes the Ayurveda Aahara logo with scaling and specified colour grading.

Food Safety And Standards Act, 2006

The Food Safety and Standards Act was promulgated by the Parliament and notified in the Gazette of India on 24th August, 2006.The main objectives of the Act were to integrate various food laws existed in the country and to ensure safe and wholesome food to its countryman. Prior to enactment of this Act there were many food laws such as Prevention of Food Adulteration (PFA) Act, 1954 and Prevention of Food Adulteration Rules, 1955 made there under, various Control Orders under Essential Commodities (EC) Act, 1955 such as Fruit Products Order 1955, Meat & Meat Products Order 1973, Milk & Milk Products Orders 1992, Vegetable Oil Products (Control) Order 1973, Edible Oil Packaging (Regulations) Order 1998 etc.

The above Acts and Control Orders were enforced by various Ministries and Departments. Multiple regulations and control created confusion in addressing food safety & quality issues and hassles to food business. After FSS Act and the Regulations made thereunder came in to existence above Acts and Orders have been repealed. As provided under the Act, Food Safety and Standards Authority (FSSAI) was established in 2008 for implementation and enforcement of the Act and Regulations made thereunder. FSSAI is an autonomous statutory body under the Ministry of Health and Family Welfare. The primary functions of FSSAI are:

(i) to lay down science based standards for articles of food and harmonize national standards with international standards

(ii) to regulate production, processing, storage, distribution, sale and import of food to ensure availability of safe and wholesome food for human consumption

There are twelve chapters in the Act consisting of various provisions, some important provisions under different Sections in respective chapter are given below:

Chapter I: Definitions of many terminologies such as Adulterants, Contaminants, Extraneous matter, Food additives, Food Business Operators (FBOs), Food safety, Food Safety Management System, Hazards, Infant food, Label, Primary food, Risk analysis, Risk assessment, Risk communication, Risk management, Sub-standard food, Unsafe food etc. are given in this chapter under Section 3. Some definitions are given as under:

(i) Adulterant: Any material which is or could be employed for making a food unsafe or sub-standard or mis-branded or containing extraneous matter.

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(ii) Contaminant: Any substance whether or not added to food but present in food as a result of production, manufacture, processing, preparation, treatment, packaging, packing, transport or holding of such food or as a result of environmental contamination.

(iii) Extraneous matter: Means any matter contained in an article of food which may be carried from raw materials, packaging materials or process systems used for its manufacture or which is added to it, but such matter does not render an article of food unsafe.

(iv) Food additive: Any substance not normally consumed as food by itself or used as typical ingredient of food, added to food for a technological purpose in the manufacture, processing, preparation, packaging, transport or holding of such food.

(v) Food safety: Means assurance that food is acceptable for human consumption according to its intended use.

(vi) Food Safety Management System: Means the adoption of Good Manufacturing Practices, Good Hygienic Practices, Hazard Analysis and Critical Control Point and such other practices as may be specified by regulations, for the food business.

(vii) Hazards: Means a biological, chemical or physical agent in or condition of, food with potential to cause an adverse health effect.

(viii) Risk analysis: Means a process consisting of three components i.e. Risk assessment, Risk management and Risk communication.

(ix) Sub-standard: Means an article of food deemed to be sub-standard if it does not meet the specified standards but not so as to render the article of food unsafe.

(x) Unsafe food: Means any article of food whose nature, substance or quality is so affected as to render it injurious to health. An article of food may be unsafe due to various reasons as stipulated under clause (zz) of Section 3 of the Act.

Chapter II: Deals with modalities of establishment of Food Safety and Standards Authority of India (FSSAI) and its composition, role and functions of FSSAI, Chairperson and Chief Executive Officer, constitution of Central Advisory Committee, Scientific Panels and Scientific Committee.

Food Authority i.e. FSSAI comprises of Chairperson and 22 members from different Central Ministries and State Governments, representatives from industry, consumers' organizations, retailers & farmer organizations and eminent food scientists. Out of 22 members one third shall be women. The role of FSSAI is to frame rules & regulations, procedure and guidelines for risk assessment, render scientific advice to Central Government and State Governments in framing policy, capacity building for enforcement officials and general awareness on food safety.

There is a Central Advisory Committee having Chief Executive Officer, FSSAI as its Chairman and Commissioners of Food Safety of all States/ UTs and representatives from industry, agriculture, consumer organization, research bodies and laboratories are its members. There are eight Scientific Panels to advice and recommend science based standards and Scientific Committee to deal with the matter not covered by Scientific Panels. The eight Scientific Panels are for:

1. Food additives, flavoring substances, processing aids and materials in contact with food
2. Pesticide and antibiotic residues
3. Genetically modified organisms and foods
4. Functional foods, nutraceuticals, dietetic and other similar products
5. Biological hazards
6. Contaminants in food chain
7. Labelling and Claims/Advertisements
8. Method of sampling and analysis

Subsequently some more Panels have been constituted to address issues related to other specific areas.

Chapter III : Deals with general principles of food safety to be followed in administering the Act by the Central Government, State Governments,

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Food Authority and other agencies responsible for implementation of the Act. The guiding principles include endeavour to achieve appropriate level of protection of human life, health and consumers' interest, carry out risk management taking in to account the results of risk assessment etc.. While framing regulations or specifying standards the Food Authority shall take in to account the prevalent practices and conditions in the country including agricultural practices, handling, storage, distribution and also international practices.

Chapter IV : Deals with general provisions with respect to articles of food, use of food additives, contaminants, naturally occurring toxic substances, heavy metals, pesticides residues, antibiotic residues and microbiological counts. Section 19 prohibits use of any additive or processing aid which is not in accordance with the Act or Regulations made thereunder. Provision for Genetically modified foods, Organic foods, Functional foods or foods for special dietary uses or nutraceuticals or health supplements etc. are laid down under Section 22 in this chapter. Section 23 deals with packaging and labeling requirements and Section 24 restriction of advertisement.

Chapter V : Deals with import of foods in India, regulations of which have been made thereafter. All articles of food imported in to the country are subjected to thorough checking and analyzed from a NABL accredited Laboratory to ensure its safety.

Chapter VI : Deals with responsibilities and liabilities of Food business operators including manufacturers , packers, wholesalers, distributors and sellers. It emphasizes on self-regulation by the FBOs. Section 28 deals with Food Recall Procedures, regulations of which have been formulated thereafter. The FBO shall immediately initiate recall process including withdrawal of food from the market if it is found not in accordance with the Act or Regulations made thereunder and inform the competent authorities of such action.

Chapter VII : Deals with Central and State authorizes responsible for enforcement of the Act. At State level, Commissioner of Food Safety (CFS) is responsible for enforcement of the Act through his sub-ordinate Officers. He is mandated to conduct survey of industrial units in his State and conduct training to enforcement officers for uniform and proper implementation of the Act and Regulations made thereunder. He is the sanctioning authority for prosecution for offences which are punishable with imprisonment. Designated Officers, appointed by the Commissioner of Food Safety are responsible for Licensing and Registration of food business at district level. He receives reports from Laboratory, take necessary action including sanction for prosecution for offences punishable by fine and investigate complaints, if any. Food Safety Officers (FSOs) under the Designated Officers are responsible for inspection of food establishments, collection of samples from manufacturing units, distributors or sellers and sending to Laboratory for analysis, launching prosecution and other enforcement activities in his area of jurisdiction. Power, duties and responsibilities of above mentioned officers are prescribed under this chapter. Provisions for Licensing and Registration of food business are stipulated under Section 31, the detail regulations of which are made thereafter. Petty FBOs who himself manufacture or sells any article of food such as petty retailers, hawkers, iterant vendors, street food vendors, temporary stall holders and such other tiny food business operators are exempted from licensing, they need to be registered with local authorities appointed by the CFS. There is provision for Improvement Notices before suspension or cancellation of license under Section 32. Provisions for Prohibition Orders and Notification of Food Poisoning are given in this chapter. There is an important provision under Section 40 that a Purchaser can get a food sample analyzed by the Food Analyst under the notice of food business operator. Procedure for launching prosecution against offenders by the Food Safety Officers has been prescribed under Section 42. Another important provision is that a FSO may be

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liable for penalty for his unreasonable and unjustified action.

Chapter VIII : Recognition and accreditation of food testing Laboratories and Referral Laboratories, organizations for food safety audit, appointment and functions of Food Analyst, procedure of sampling and analysis of foods are prescribed in this chapter. As per Section 47 FSO shall collect four samples from a batch of product, send one part to the designated Lab, one part to a NABL accredited Lab, if so requested by the FBO under intimation to the Designated Officer, retain remaining two parts to the Designated Officer, from which one part is sent to Referral Lab in case first part or second part of sample (if sent to a NABL Lab) found non- conforming. The Food Analyst, appointed by the Commissioner of Food Safety shall analyze food sent by FSO as per the specifications and send analysis report with his findings and remarks to the Designated Officer within stipulated time prescribed in the Regulations. On the basis of analysis report the Designated Officer initiates further actions including sanction of Adjudication for the offence punishable with fine or recommend to the Commissioner of Food Safety for launching prosecution for the offence punishable with imprisonment, as the case may be.

Chapter IX : Deals with provisions for penalty and punishment for offences. Earlier under the Prevention of Food Adulteration Act, 1954 punishment with imprisonment as well as fine for any offence was prescribed, but under the FSS Act punishment only with penalty for offences which do not cause injury to health of consumers, for example sub-standard food. Punishment with imprisonment as well as with fine for offences which cause injury to the health of the consumers and other offences like carrying business without License or interfering with seized items etc. Quantum of fine and imprisonment has been prescribed under various Sections from 48 to 67 of this chapter depending upon the nature of offence. In case of death of a person due to consuming unsafe food, minimum imprisonment for the offender prescribed is 7 years which may extend to life and minimum fine of Rupees 10 lakhs, which shall be given as compensation to the next kin of the victim within six months and an interim relief within 30 days of death.

Chapter X : Deals with Adjudication and Appellate Tribunal for punishment with fine for offences committed by the food business operators. The adjudicating Officers are appointed by the State Government who is not below the rank of Additional District Magistrate. Power of Adjudicating Officers and Appellate Tribunal and procedure for adjudication and appeal etc. have been prescribed in this chapter. The offences which are punishable with imprisonment are tried by normal Criminal Courts. There is provision for establishment of Special Courts for speedy trial of cases. The offences which are punishable by imprisonment for a term exceeding three years, such cases shall be referred to Special Courts, if so established.

Chapter XI: Deals with administrative aspects of Food Authority including budget, finances, accounts, Annual Report etc.

Chapter XII : Deals with Power of Central and State Governments to implement the Act. Central Government can frame rules and regulations, the State Government also can make rules to administer the Act from time to time. There is provision under Section 97 for repeal of any Act or Orders under any Act. Accordingly the Prevention of Adulteration Act 1954 and various Control Orders under Essential Commodities Act 1955 have been repealed after Food Safety and Standards Regulations came in to force during the year 2011.

Syllabus- Impact of different dietary patterns: Mediterranean diet, Keto Diet, DASH diet, the MIND diet, Vegan diet, Ovo-lacto-vegetarian, Pescovegetarian, Plant-based diet, Intermittent diet, the Nordic diet, importance of organic foods, merits and demerits of genetically modified foods and inflammatory foods such as fried foods,

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cookies, hot dogs, red meat, refined grains, pizza, burger etc,. and instant foods like Maggi etc,.

Learning objective- Explain the impact of different dietary patterns: Mediterranean diet, Keto Diet, DASH diet, the MIND diet, Vegan diet, Ovolacto- vegetarian, pesco-vegetarian, plant-based diet, Intermittent diet, the Nordic diet, importance of organic foods, merits and demerits of genetically modified foods

Impact of different dietary patterns: A dietary pattern is defined as the quantity, variety, or combination of different foods and beverage in a diet and the frequency with which they are habitually consumed.

Mediterranean Diet

The Mediterranean diet is a popular and widely studied dietary pattern that is based on the traditional eating habits of people living in countries bordering the Mediterranean Sea, such as Greece, Italy, and southern Spain. This diet has gained attention and praise for its potential health benefits and its focus on whole, unprocessed foods. Here are some key features of the Mediterranean diet:

1. **Emphasis on Plant-Based Foods:** The Mediterranean diet places a strong emphasis on fruits, vegetables, legumes (like beans and lentils), nuts, seeds, and whole grains. These foods are rich in vitamins, minerals, fiber, and antioxidants.
2. **Olive Oil**: Olive oil is a primary source of dietary fat in this diet. It is used for cooking, salad dressings, and as a condiment. Extra virgin olive oil, in particular, is favored for its high content of monounsaturated fats, which are considered heart-healthy.
3. **Lean Protein:** Fish and poultry are preferred sources of protein over red meat. Fatty fish like salmon, sardines, and mackerel are especially favoured due to their high omega-3 fatty acid content.
4. **Dairy in Moderation:** Dairy products, such as yogurt and cheese, are included in moderation. Traditional Mediterranean diets often feature fermented dairy products, which are easier to digest.
5. **Red Wine in Moderation:** Red wine, when consumed in moderation, is a common part of the Mediterranean diet. It is often enjoyed with meals and is believed to have certain health benefits due to its antioxidant content.
6. **Limited Processed Foods:** Highly processed foods, including sugary snacks and fast food, are limited. The focus is on fresh, whole foods.
7. **Herbs and Spices:** Herbs and spices are used to flavor food, reducing the need for excess salt. Common seasonings include garlic, oregano, basil, and rosemary.
8. **Social Eating:** The Mediterranean diet is not just about the foods themselves but also the way people eat together and enjoy meals. Sharing meals with family and friends and savoring the dining experience is an important aspect of the diet.

Benefits of the Mediterranean diet

1. **Heart Health:** Research has shown that the Mediterranean diet can help reduce the risk of heart disease by improving cholesterol levels, reducing blood pressure, and lowering inflammation.
2. **Weight Management:** It may assist in weight management and weight loss, as it encourages a high intake of fiber and nutrient-dense foods while limiting processed and high-calorie options.
3. **Diabetes Management:** This diet can help manage and prevent type 2 diabetes by improving insulin sensitivity and blood sugar control.
4. **Brain Health:** Some studies suggest that the Mediterranean diet may be associated with a lower risk of cognitive decline and neurodegenerative diseases like Alzheimer's.
5. **Reduced Cancer Risk:** Certain aspects of the diet, such as the high consumption of fruits, vegetables, and fish, have been linked to a reduced risk of various types of cancer.
6. **Longevity:** It has been associated with a

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longer life expectancy and a reduced risk of premature death.

It's important to note that the Mediterranean diet is more of a dietary pattern than a strict set of rules, and it can be adapted to individual preferences and dietary restrictions.

Keto Diet

The ketogenic diet, often referred to as the keto diet, is a low-carbohydrate, high-fat diet designed to encourage the body to enter a state of ketosis. Ketosis is a metabolic state in which the body primarily relies on fat for energy instead of carbohydrates. This is achieved by significantly reducing carbohydrate intake and increasing fat consumption. Here are the key principles of the keto diet:

1. **Low Carbohydrate Intake:** The foundation of the keto diet is a very low carbohydrate intake, typically ranging from 20 to 50 grams of net carbs per day. This restriction forces the body to use stored fat for energy.
2. **Moderate Protein:** While protein is an important part of the diet, it's generally consumed in moderate amounts. Consuming too much protein can potentially interfere with ketosis, as excess protein can be converted into glucose in the body.
3. **High Fat Consumption:** The majority of daily calorie intake comes from dietary fats, often comprising around 70-75% of total calories. This includes sources such as avocados, nuts, seeds, olive oil, and fatty cuts of meat.
4. **Ketosis:** Achieving and maintaining a state of ketosis is the primary goal of the diet. Ketosis occurs when the liver breaks down fat into ketones, which become the body's primary energy source. This process is thought to have various benefits, including weight loss and improved blood sugar control.
5. **Avoiding High-Carb Foods:** Foods high in carbohydrates, such as bread, pasta, grains, starchy vegetables, sugary foods, and most fruits, are significantly restricted or eliminated in the diet.
6. **Focus on Low-Carb Vegetables:** Non-starchy vegetables, such as leafy greens, broccoli, and cauliflower, are encouraged as they provide essential nutrients with fewer carbohydrates.
7. **Fasting and Intermittent Fasting:** Some individuals on the keto diet incorporate intermittent fasting, which involves cycling between periods of eating and fasting, to enhance the effects of ketosis and weight loss.

Benefits of the keto diet may include weight loss, improved blood sugar control (beneficial for some people with type 2 diabetes), and increased levels of HDL (good) cholesterol. However, it's essential to consider potential drawbacks and challenges, such as the "keto flu" (initial side effects when transitioning into ketosis), nutrient deficiencies, and the difficulty of adhering to such a strict dietary pattern long-term.

The keto diet is not recommended for everyone and may have adverse effects on certain individuals, particularly those with specific medical conditions. It's essential to consult with a healthcare professional or registered dietitian before starting a ketogenic diet, as they can provide guidance based on your individual health needs and goals.

Dash Diet

The DASH diet, which stands for "Dietary Approaches to Stop Hypertension," is a dietary plan primarily designed to help reduce and prevent high blood pressure (hypertension). It is a well-researched and evidence-based eating pattern that focuses on heart-healthy foods and emphasizes reducing sodium intake. The DASH diet is not only effective in managing blood pressure but is also considered a generally healthy eating plan.

Key principles of the DASH diet include:

1. **Fruits and Vegetables:** The DASH diet encourages a high consumption of fruits and vegetables, which are rich in essential vitamins, minerals, fiber, and antioxidants. These foods provide key nutrients that can help lower blood pressure.

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2. **Whole Grains:** Whole grains like brown rice, whole wheat bread, and oatmeal are a primary source of carbohydrates in the DASH diet. They provide sustained energy and fiber, which can contribute to better heart health.
3. **Lean Protein:** Lean protein sources, such as poultry, fish, and plant-based protein like beans and legumes, are included. These protein sources are lower in saturated fat compared to red meat.
4. **Nuts, Seeds, and Legumes:** These provide healthy fats, protein, and essential nutrients. They are encouraged as a part of the diet.
5. **Dairy:** Low-fat or fat-free dairy products are recommended to provide calcium and other essential nutrients without excess saturated fat.
6. **Limit Sodium:** Reducing sodium intake is a key feature of the DASH diet. It promotes lowering salt intake, which can help manage blood pressure. This includes cutting back on high-sodium processed and restaurant foods.
7. **Limit Sweets and Sugary Beverages:** The DASH diet advises limiting added sugars and sweets, including sugary beverages.
8. **Moderate Alcohol:** If you consume alcohol, it should be in moderation, with a focus on one drink per day for women and up to two drinks per day for men.

The DASH diet provides specific daily and weekly guidelines for the number of servings in each food group, making it relatively easy to follow. It's a flexible and balanced eating plan that can be adapted to individual preferences and dietary needs. Research has shown that the DASH diet can effectively lower blood pressure and reduce the risk of cardiovascular diseases. It is recommended by healthcare professionals for individuals with hypertension and those looking to improve their heart health.

The MIND Diet

The MIND diet is a dietary plan that stands for "Mediterranean-DASH Diet Intervention for Neurodegenerative Delay." It is a hybrid of two well-known diets: the Mediterranean diet and the DASH (Dietary Approaches to Stop Hypertension) diet. The MIND diet is specifically designed to promote brain health and reduce the risk of neurodegenerative diseases, such as Alzheimer's disease.

The MIND diet emphasizes consuming foods that have been linked to improved cognitive function and a reduced risk of cognitive decline. Key components of the MIND diet include:

1. **Emphasis on Berries:** The MIND diet places a strong focus on consuming berries, such as blueberries and strawberries, due to their high levels of antioxidants, which are thought to be beneficial for brain health.
2. **Leafy Green Vegetables:** It encourages the consumption of leafy greens, like spinach and kale, which are rich in vitamins and minerals.
3. **Whole Grains:** Whole grains, such as brown rice, whole wheat pasta, and quinoa, are included for their fiber and nutrient content.
4. **Nuts:** Nuts, especially walnuts, are recommended for their healthy fats and potential brain-boosting properties.
5. **Beans and Legumes:** These are a good source of protein and fiber.
6. **Fish:** Fatty fish, like salmon and trout, are promoted for their omega-3 fatty acids, which are beneficial for brain health.
7. **Olive Oil:** Olive oil is a primary source of healthy fats in the Mediterranean diet and is recommended in the MIND diet.
8. **Poultry:** The MIND diet suggests consuming poultry in moderation.
9. **Red Wine:** Moderate consumption of red wine, known for its potential health benefits due to its polyphenols, is encouraged.
10. Limit Red Meat: Red meat and high-sugar foods should be consumed sparingly.
11. Cheese: Cheese consumption is recommended in moderation.
12. Sweets: Sugary and processed foods are discouraged.

The MIND diet also encourages regular physical activity and staying socially active as part

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of a holistic approach to brain health. Research suggests that following the MIND diet may be associated with a lower risk of developing Alzheimer's disease and cognitive decline. However, it's important to note that while the MIND diet is based on scientific principles, more research is needed to fully understand its long-term effects on brain health.

Vegan Diet

A vegan diet is a plant-based dietary pattern that excludes all animal products. It focuses on consuming foods derived from plants, such as fruits, vegetables, grains, legumes, nuts, seeds, and plant-based oils, while avoiding all forms of meat, dairy, eggs, and other animal-derived ingredients or products. Here are the key characteristics and aspects of a vegan diet:

1. **Plant-Based Foods:** Vegan diets are centered around plant-based foods, which provide a wide range of essential nutrients, including vitamins, minerals, fiber, and antioxidants.
2. **No Animal Products:** Vegans do not consume any animal products, which means no meat (including poultry and seafood), dairy (milk, cheese, yogurt, butter), eggs, honey, and other animal-derived ingredients.
3. **Whole and Minimally Processed Foods:** Many vegans focus on whole, unprocessed foods as the foundation of their diet. These may include whole grains, fresh fruits and vegetables, and minimally processed plant-based proteins.
4. **Plant-Based Protein Sources:** To meet protein needs, vegans turn to sources like tofu, tempeh, seitan, legumes (beans, lentils, and peas), nuts, seeds, and plant-based protein substitutes.
5. **Plant-Based Milk Alternatives:** Instead of dairy milk, vegans often choose plant-based milk options like almond milk, soy milk, rice milk, or oat milk.
6. **Fortified Foods:** To address potential nutrient gaps, some vegans consume fortified foods like fortified plant-based milk, breakfast cereals, and nutritional yeast. These can provide important nutrients like vitamin B12, which is not naturally present in plant-based foods.

Vegans choose this dietary lifestyle for various reasons, including:

1. **Ethical and Animal Welfare:** Many vegans are motivated by ethical concerns about the treatment of animals in the food industry and aim to reduce their contribution to animal suffering.
2. **Environmental Sustainability:** Adopting a vegan diet can lower one's environmental impact, as the production of plant-based foods generally requires fewer resources and produces fewer greenhouse gas emissions compared to animal agriculture.
3. **Health:** Some people adopt a vegan diet for potential health benefits, such as reducing the risk of chronic diseases like heart disease, certain cancers, and type 2 diabetes. A well-balanced vegan diet can also promote weight management and overall well-being.
4. **Cultural and Religious Beliefs:** Certain cultures and religions promote or require vegan or vegetarian dietary practices.
5. **Personal Choice:** Taste preferences, culinary traditions, and social influences can also play a role in choosing a vegan diet.

While a vegan diet can be nutritious and healthful, it's essential to plan it properly to ensure the intake of essential nutrients like vitamin B12, iron, calcium, and omega-3 fatty acids. Some vegans may need to consider supplements or fortified foods to meet these nutritional needs.

Ovo-Lacto-Vegetarian

An ovo-lacto-vegetarian, often simply referred to as a lacto-ovo vegetarian, is an individual who follows a vegetarian diet that includes both dairy products and eggs while excluding meat and fish. This is one of the most common forms of vegetarianism. Here are the key characteristics of an ovo-lacto vegetarian diet:

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1. **Dairy Products:** Lacto-ovo vegetarians consume dairy products, including milk, cheese, yogurt, and butter. These items provide a source of protein, calcium, and other nutrients.
2. **Eggs:** Ovo-lacto vegetarians eat eggs, which are an important source of protein, vitamins, and minerals.
3. **No Meat or Fish:** Ovo-lacto vegetarians do not consume meat, which includes beef, pork, poultry, and game meats. They also abstain from fish and seafood.
4. **Plant-Based Foods:** The majority of their diet is based on plant-derived foods, such as fruits, vegetables, legumes (beans, lentils, and peas), grains (rice, wheat, oats, etc.), nuts, seeds, and plant-based oils.
5. **No Other Animal Products:** Like other vegetarians, ovo-lacto vegetarians do not consume other animal products such as gelatin and animal-derived food additives.

Lacto-ovo vegetarianism is a flexible and well-balanced diet that provides a wide range of nutrients while excluding animal products. People choose this dietary lifestyle for various reasons, including:

1. **Health:** Some individuals adopt a lacto-ovo vegetarian diet for its potential health benefits, such as lower risks of heart disease, certain cancers, and type 2 diabetes. It can also support weight management.
2. **Ethical Reasons:** Concerns about animal welfare and the treatment of animals in the food industry lead many people to choose vegetarianism.
3. **Environmental Sustainability:** Reducing the consumption of animal products can have a lower environmental impact in terms of greenhouse gas emissions, land use, and water usage.
4. **Cultural and Religious Beliefs:** Some cultures and religions advocate vegetarianism or have specific dietary restrictions that align with a lacto-ovo vegetarian diet.
5. **Personal Preference:** Taste preferences, culinary traditions, or family and social influences can also play a role in choosing a lacto-ovo vegetarian diet.

Ovo-lacto vegetarians generally have a wide variety of food choices and can meet their nutritional needs by combining dairy products, eggs, and plant-based foods. However, it's still important to ensure they get essential nutrients, particularly protein, iron, vitamin B12, and omega-3 fatty acids, by incorporating a diverse range of foods into their diet.

Pescovegetarian

A pescovegetarian, also known as a pesco-vegetarian or pesco-vegan, is an individual who follows a vegetarian diet but includes fish and other seafood in their diet while excluding other forms of meat such as poultry, beef, pork, and game. In essence, a pescovegetarian diet is a hybrid between a traditional vegetarian diet and a pescatarian diet. Here are some key characteristics of a pescove-getarian diet:

1. **Fish and Seafood Inclusion:** The primary distinction of a pescovegetarian diet is the consumption of fish and seafood. This can include a variety of fish such as salmon, trout, tilapia, cod, and seafood like shrimp, clams, mussels, and crab.
2. **Exclusion of Land Animals:** Pescovegetar-ians avoid land animals, which means they do not eat poultry, red meat, and game meats like venison.
3. **Plant-Based Foods:** The rest of the diet is typically plant-based. Pescovegetarians consume fruits, vegetables, legumes, grains, nuts, seeds, and dairy products, and some may even choose to exclude dairy, making their diet closer to pescetarianism.
4. **No Other Animal Products:** Like vegetarians, pescovegetarians exclude other animal products like eggs and gelatin from their diet.

People may choose a pescovegetarian diet for various reasons, including:

1. **Health Benefits:** Some individuals believe that

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including fish in their diet can provide essential omega-3 fatty acids, which are important for heart and brain health.

2. **Ethical Reasons:** Pescovegetarians may be concerned about the ethical treatment of animals raised for meat but feel that seafood consumption aligns better with their values.
3. **Environmental Sustainability:** While some forms of fishing can have environmental concerns, pescovegetarians might view seafood consumption as a more sustainable and eco-friendly option compared to other forms of meat production.
4. **Cultural or Taste Preferences:** For some, seafood is a preferred source of protein due to taste, culture, or culinary traditions.

It's important for pescovegetarians to make informed choices regarding their seafood sources and sustainability. Some fish and seafood options are more environmentally friendly and have lower mercury and contamination risks than others. Additionally, individuals on a pescovegetarian diet should ensure they meet their nutritional needs, particularly regarding protein, omega-3 fatty acids, and other essential nutrients, by including a variety of plant-based foods and seafood in their diet.

Plant-Based Diet

A plant-based diet is a dietary approach that emphasizes whole, plant-derived foods while minimizing or excluding animal products. Plant-based diets can vary in strictness, and individuals may adopt this diet for various reasons, including health, environmental, ethical, and cultural considerations. Here's an overview of what a plant-based diet typically entails:

1. **Emphasis on Fruits and Vegetables:** Plant-based diets are rich in fruits and vegetables, providing a wide range of essential vitamins, minerals, and antioxidants.
2. **Whole Grains:** Whole grains like brown rice, quinoa, whole wheat, oats, and barley are important sources of complex carbohydrates and fiber.
3. **Legumes:** Beans, lentils, chickpeas, and other legumes are excellent sources of plant-based protein, fiber, and essential nutrients.
4. **Nuts and Seeds:** These provide healthy fats, protein, and a variety of vitamins and minerals. Common choices include almonds, walnuts, chia seeds, flaxseeds, and pumpkin seeds.
5. **Plant-Based Proteins:** Plant-based diets often include sources of plant protein like tofu, tempeh, seitan, and meat substitutes made from soy, peas, or other plant-based ingredients.
6. **Plant Oils:** Healthy plant-based fats, such as olive oil, avocado oil, and coconut oil, are used for cooking and dressings.
7. **Dairy Alternatives:** Milk, yogurt, and cheese made from plants like almonds, soy, or oats are used as substitutes for dairy products.
8. **Limited or No Animal Products:** Depending on the individual's preference, a plant-based diet may exclude or significantly reduce the consumption of animal products, including meat, poultry, fish, dairy, and eggs.
9. **Minimized Processed Foods:** Highly processed and refined foods are typically limited on a plant-based diet. These include sugary snacks, processed meats, and heavily refined grains.
10. **No Animal-Derived Additives:** Some strict plant-based diets also exclude additives like gelatin and certain food colorings, which may be derived from animal sources.

There are several reasons why people choose plant-based diets:

1. **Health Benefits:** Plant-based diets are associated with a reduced risk of chronic diseases, such as heart disease, diabetes, and certain types of cancer. They are typically low in saturated fats and high in fiber, vitamins, and antioxidants.
2. **Environmental Sustainability:** Plant-based diets have a lower environmental footprint, as they tend to use fewer resources and produce fewer greenhouse gas emissions compared to diets heavy in animal products.

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3. **Ethical and Animal Welfare:** Some people adopt plant-based diets due to ethical concerns about the treatment of animals in the food industry.
4. **Cultural and Religious Reasons:** Certain cultures and religions advocate plant-based diets as a part of their traditions and beliefs.
5. **Weight Management:** Plant-based diets can support weight management and weight loss, as they are often lower in calorie density and promote satiety.

It's important to note that plant-based diets can be tailored to individual preferences and nutritional needs. Some plant-based diets are strict vegan diets that exclude all animal products, while others may include occasional animal products, making them more flexible.

To ensure a well-balanced plant-based diet, it's important to pay attention to the intake of essential nutrients like vitamin B12, iron, calcium, and omega-3 fatty acids, as they may be less abundant in plant-based foods. Proper meal planning and, in some cases, supplementation may be necessary to address these nutritional considerations.

Intermittent Diet

Intermittent fasting (IF) is a popular dietary approach that involves cycling between periods of eating and fasting. Instead of specifying which foods to eat, it focuses on when you should eat. There are several different methods of intermittent fasting, but the basic concept involves alternating between eating and fasting periods. Here are some common approaches to intermittent fasting:

1. **16/8 Method:** This method involves fasting for 16 hours each day and limiting your eating to an 8-hour window. For example, you might skip breakfast and eat between 12:00 PM and 8:00 PM.
2. **5:2 Diet:** With this approach, you eat normally for five days of the week and consume a very low-calorie intake (around 500-600 calories) on the other two non-consecutive days.
3. **Eat-Stop-Eat:** In this method, you fast for a full 24 hours once or twice a week. For example, you might have dinner at 7:00 PM and then not eat again until 7:00 PM the following day.
4. **Alternate-Day Fasting:** With alternate-day fasting, you switch between days of normal eating and days of fasting or consuming very few calories.
5. **Warrior Diet:** The Warrior Diet involves fasting for 20 hours and then eating a large meal during a 4-hour eating window in the evening.
6. **OMAD (One Meal A Day):** This approach involves eating just one large meal during a specific hour each day and fasting for the remaining 23 hours.

Intermittent fasting has gained popularity due to its potential health benefits, which may include:

1. **Weight Loss:** IF can lead to calorie restriction, which may result in weight loss. It can also promote fat loss and preserve lean muscle mass.
2. **Improved Insulin Sensitivity:** Some studies suggest that intermittent fasting can enhance insulin sensitivity, which is important for blood sugar regulation.
3. **Reduced Inflammation:** Fasting periods may help reduce inflammation in the body, which is associated with various chronic diseases.
4. **Heart Health:** IF may have positive effects on heart health by improving cholesterol levels, blood pressure, and reducing the risk of cardiovascular diseases.
5. **Brain Health:** There is some evidence to suggest that IF may support brain health, improve cognitive function, and reduce the risk of neurodegenerative diseases.

It's important to note that intermittent fasting may not be suitable for everyone, and it's essential to consult with a healthcare professional, especially if you have underlying medical conditions or are pregnant. Also, the success of intermittent fasting depends on individual adherence, and it's not a guaranteed weight loss solution. Additionally, the

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quality of the food consumed during eating periods still plays a crucial role in overall health. It's essential to focus on balanced, nutritious meals and stay hydrated during fasting periods.

The Nordic Diet

The Nordic Diet is a regional dietary pattern that has gained attention for its potential health and environmental benefits. It is inspired by the traditional eating habits of the Nordic countries, which include Denmark, Finland, Iceland, Norway, and Sweden. Here are some key characteristics of the Nordic Diet:

1. **High in Local and Seasonal Foods:** The Nordic Diet emphasizes the use of locally-sourced and seasonal ingredients. This not only supports local farmers but also reduces the environmental impact associated with long-distance transportation of food.
2. **Abundance of Fish:** Given the proximity to the North Atlantic and the Baltic Sea, fish and seafood are prominent in the Nordic Diet. Fatty fish like salmon, herring, and mackerel are rich in omega-3 fatty acids, which are beneficial for heart health.
3. **Whole Grains:** Whole grains, such as oats, barley, rye, and whole grain bread, are staples in the Nordic Diet. These grains provide fiber, vitamins, and minerals.
4. **Root Vegetables:** Root vegetables like potatoes, carrots, and turnips are commonly used in Nordic cuisine. They are often preserved through fermentation, another characteristic of this diet.
5. **Berries:** Berries, such as lingonberries, blueberries, and cloudberries, are rich in antioxidants and are a common component of Nordic dishes.
6. **Dairy Products:** Dairy products like yogurt, cheese, and milk are part of the diet, though lower-fat and fermented versions are preferred.
7. **Game Meat:** Lean meats like reindeer and game birds are consumed, and they are often hunted rather than raised on farms.
8. **Fermented Foods:** Fermented foods like pickled herring, sauerkraut, and fermented dairy products are commonly eaten. These foods provide probiotics, which are beneficial for gut health.
9. **Local Herbs and Spices:** Nordic cuisine uses locally-sourced herbs and spices for flavoring, including dill, horseradish, and juniper.
10. **Sustainability:** The Nordic Diet places a strong emphasis on sustainability and reducing environmental impact. It encourages responsible fishing and agriculture, minimizing food waste, and choosing organic and locally-produced foods.

The Nordic Diet is often compared to the Mediterranean Diet for its potential health benefits, such as reducing the risk of chronic diseases and promoting heart health. Research suggests that this diet can have positive effects on weight management, cholesterol levels, and blood pressure. In summary, the Nordic Diet is characterized by a focus on local, seasonal, and sustainably-sourced foods, with an emphasis on fish, whole grains, root vegetables, berries, and fermented products. It is seen as a healthy and environmentally responsible way of eating.

Importance of Organic Foods

Organic food, ecological food, or biological food are foods and drinks produced by methods complying with the standards of organic farming. Standards vary worldwide, but organic farming features practices that cycle resources, promote ecological balance, and conserve biodiversity. Organizations regulating organic products may restrict the use of certain pesticides and fertilizers in the farming methods used to produce such products. Organic foods are typically not processed using irradiation, industrial solvents, or synthetic food additives.

1. **Reduced Exposure to Chemicals:** Organic farming practices prohibit the use of synthetic pesticides, herbicides, and fertilizers. This means that organic foods are less likely to

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contain residues of these chemicals, reducing consumers' exposure to potentially harmful substances.

2. **Healthier for Consumers:** Organic foods are produced without the use of genetically modified organisms (GMOs), synthetic hormones, or antibiotics. Many people choose organic foods for their potential health benefits, as they are seen as a cleaner and more natural option.
3. **Environmental Sustainability:** Organic farming methods focus on soil health and biodiversity. By avoiding synthetic chemicals, organic farming can help protect the environment, prevent soil degradation, and reduce water pollution. It also promotes practices like crop rotation and the use of cover crops to improve soil quality.
4. **Reduced Antibiotic Use:** Organic livestock farming generally restricts the use of antibiotics and synthetic hormones in animal husbandry. This can help reduce the development of antibiotic-resistant bacteria and may be more humane for the animals.
5. **Enhanced Biodiversity:** Organic farms often support greater biodiversity, including beneficial insects and native plant species. This can help maintain ecosystem balance and reduce the need for chemical interventions.
6. **Improved Soil Quality:** Organic farming techniques, such as composting and the use of organic matter, can enhance soil fertility and structure, leading to long-term sustainability.
7. **Support for Sustainable Agriculture:** Organic farming practices emphasize sustainability and are often seen as a more environmentally responsible approach to agriculture. They can help reduce the negative impacts of industrial agriculture, such as soil erosion and excessive water usage.
8. **Local and Small-Scale Agriculture:** Many organic farms are smaller, local operations, which can promote local economies, reduce transportation-related emissions, and encourage community involvement.
9. **Non-GMO:** Organic standards prohibit the use of genetically modified organisms, providing a non-GMO food option for those concerned about the potential risks associated with GMOs.
10. **Consumer Choice:** Organic foods offer consumers a choice and the opportunity to support agricultural practices that align with their values and priorities.

It's important to note that the organic label does not guarantee that a product is entirely free from synthetic chemicals or pesticides, as some approved substances can still be used in organic farming. Additionally, organic foods may be more expensive due to the labor-intensive and lower-yield nature of organic farming. As a result, the importance of organic foods can vary from person to person, depending on their individual values, health concerns, and environmental priorities.

Merits and Demerits of Genetically Modified Foods

Merits

1. Making enhancements in the quality of the plants, the production of the plants has increased. Due to this, a large part of the population of the world can be fed. Poverty rate can also be decreased.
2. Genetically modified crops or food can increase the yield and, in less time, many varieties of food can be obtained. The food is also rich of nutrients.
3. Due to genetically modified crops, agriculturists use fewer pesticides and insecticides because there are in built genes in the plants which fight against various pests. 4
4. In the future, it would be possible to produce such varieties of fruits and vegetables, which will have edible vaccines and other drugs in the. So there will be no need of taking any medicines for the disease. For example, banana is good for treating Hepatitis B.
5. Genetic engineer has made it possible to produce food in the form of fruit and

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vegetables without their season under the laboratory conditions.

6. Many genes are inserted in the genetically modified food, which are inserted in the body by eating and replace the defective genes.

Demerits

1. It is not quite sure that if the genes of interest are extracted from body, they will perform their duty in the same manner at any other place.
2. It is possible that the genes inserted in the genetically modified food get immune to the pesticides and insecticides and do not show the desired results.
3. There is possibility of viruses transforming into more dangerous and virulent form than their existing state just because of the genetic modifications.
4. The immune system of an individual may not accept the desired genes when inserted through genetically modified food. May be the diseases get immune to the antibiotics.
5. There is possibility that the consumption of genetically modified food may cause cancer because of its hazardous effects.
6. It is possible that genetically modified food may become the reason of destruction of natural flora and fauna, because there are chances of transferring of unnecessary traits of plants through cross pollination which may harm the human health.
7. The biggest disadvantage is that the production of genetically modified food will bind to the developed countries because of rich resources and developing countries will have to look towards them for the food provision.

Inflammatory Foods

Inflammatory foods are those that can potentially trigger inflammation in the body. Chronic inflammation has been linked to various health conditions, including heart disease, cancer, arthritis, and more. While acute inflammation is a natural response of the body to injury or infection, chronic inflammation can be harmful.

Some common inflammatory foods include:

1. **Processed Foods**: Highly processed foods like sugary snacks, fast food, and convenience foods often contain unhealthy fats, refined sugars, and artificial additives, all of which can contribute to inflammation.
2. **Trans Fats**: Trans fats are found in partially hydrogenated oils and many fried and commercially baked products. They are known to promote inflammation and increase the risk of heart disease.
3. **Refined Sugars**: Refined sugars and high-fructose corn syrup are common in many processed foods and sugary drinks. Excessive consumption can lead to inflammation and related health issues.
4. **Saturated Fats**: While not all saturated fats are inherently inflammatory, excessive consumption of them can contribute to inflammation. They are found in fatty cuts of meat and full-fat dairy products.
5. **Red and Processed Meats**: Red meat, especially when processed (e.g., sausages, hot dogs), can promote inflammation. This is partly due to the high levels of saturated fats and advanced glycation end products (AGEs) in these foods.
6. **Alcohol**: Excessive alcohol consumption can trigger inflammation in the liver and other parts of the body.
7. **Refined Carbohydrates**: Foods made with white flour, such as white bread and pasta, can lead to spikes in blood sugar levels, potentially causing inflammation.
8. **Artificial Additives**: Some food additives, preservatives, and artificial colorings have been linked to inflammatory responses in some individuals.
9. **Dairy Products**: For some people, dairy products can trigger inflammation due to lactose intolerance or sensitivity to the proteins in dairy.
10. **Gluten**: Gluten-containing grains, such as wheat, rye, and barley, can cause inflammation in individuals with celiac disease or non-celiac gluten sensitivity.

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Side effect of inflammatory foods on body

Inflammatory foods can have a negative impact on the body by promoting chronic inflammation, which is associated with various health issues. Chronic inflammation is a prolonged, low-level inflammatory response in the body and is linked to conditions like heart disease, diabetes, cancer, and autoimmune diseases. Here are some of the effects of inflammatory foods on the body:

1. **Increased Risk of Chronic Diseases**: Consuming inflammatory foods over time can increase the risk of developing chronic diseases. For example, a diet high in trans fats, refined sugars, and processed meats has been associated with a higher risk of heart disease, while sugary and highly processed foods are linked to an increased risk of type 2 diabetes.
2. **Gut Health**: Inflammatory foods can disrupt the balance of the gut microbiome, leading to an overgrowth of harmful bacteria and a decrease in beneficial bacteria. An imbalanced gut microbiome is associated with digestive problems, inflammation, and other health issues.
3. **Weight Gain**: Inflammatory foods are often calorie-dense and can contribute to weight gain and obesity. Excess body fat is a source of chronic inflammation as it releases pro-inflammatory substances.
4. **Joint Pain**: Inflammatory foods can exacerbate inflammation in the joints and may contribute to conditions like rheumatoid arthritis and osteoarthritis. Reducing inflammatory foods can sometimes lead to a reduction in joint pain.
5. **Skin Issues**: Some individuals may experience skin problems, such as acne or eczema, when consuming a diet high in inflammatory foods.
6. **Insulin Resistance**: Diets high in added sugars and processed carbohydrates can lead to insulin resistance, a condition that is a precursor to type 2 diabetes. Chronic inflammation is associated with insulin resistance.
7. **Cardiovascular Health**: High levels of inflammation are linked to the development of atherosclerosis (hardening of the arteries) and an increased risk of heart attacks and strokes. Diets rich in inflammatory foods can contribute to this process.
8. **Cancer Risk**: Chronic inflammation is a risk factor for various types of cancer. Diets high in inflammatory foods may increase the risk of cancer development.
9. **Mood and Mental Health**: Some studies suggest a connection between chronic inflammation and mood disorders, such as depression. An anti-inflammatory diet may help improve mental well-being.
10. **Autoimmune Diseases**: Inflammatory foods may trigger or exacerbate autoimmune diseases, where the immune system attacks healthy tissues. Reducing inflammation through diet can help manage these conditions.

It's important to note that the effects of inflammatory foods can vary from person to person, and not everyone will experience the same negative consequences. However, adopting an anti-inflammatory diet that focuses on whole, unprocessed foods, rich in fruits, vegetables, whole grains, lean proteins, and healthy fats, can help reduce chronic inflammation and promote overall health.

Instant Foods

Instant foods, also known as convenience or processed foods, are typically foods that are pre-packaged, easy to prepare, and have a longer shelf life due to various preservation methods. These foods are designed for quick and convenient consumption, making them popular choices for people with busy lifestyles. However, many instant foods are often highly processed and may contain additives, preservatives, and unhealthy ingredients. Here are some examples of instant foods:

1. **Instant Noodles**: These are dried or precooked noodles that can be prepared quickly by boiling or microwaving. They often come with flavoring packets that can be high in sodium and artificial flavors.

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2. **Instant Soup**: These are dehydrated or canned soups that can be quickly heated for consumption. Some canned soups can be high in sodium and preservatives.
3. **Frozen Dinners**: These are pre-packaged meals that are frozen and can be reheated in the oven or microwave. They often contain a mix of meat, vegetables, and starches. Some may contain high levels of salt, saturated fat, and artificial additives.
4. **Instant Oatmeal**: Packaged in single-serving portions, instant oatmeal can be prepared by adding hot water. Some varieties may contain added sugar and artificial flavorings.
5. **Instant Rice**: Pre-cooked and then dehydrated, instant rice can be rehydrated quickly with boiling water. It may not have the same nutritional value as regular rice.
6. **Instant Mashed Potatoes**: These are made from dehydrated potatoes and can be prepared quickly by adding hot water or milk. They often contain added salt, preservatives, and sometimes artificial flavors.
7. **Canned Foods**: Canned vegetables, fruits, and soups are convenient and have a long shelf life, but some can contain added salt and preservatives.
8. **Instant Coffee and Tea**: Instant coffee and tea products are dehydrated versions of the real thing. While they offer convenience, they may lack the depth of flavor and aroma found in freshly brewed coffee or tea.
9. **Instant Breakfast Cereals**: Many breakfast cereals are pre-packaged and come in a variety of flavors. Some of them are high in added sugars.

It's essential to note that not all instant foods are unhealthy, and some can be part of a balanced diet. However, it's crucial to read food labels and choose products with minimal additives, lower sodium, and less added sugar when possible. A diet primarily composed of whole, unprocessed foods, such as fruits, vegetables, lean proteins, and whole grains, is generally considered healthier and more nutritious.

Side Effect of Instant foods on body - The consumption of instant foods can have both short-term and long-term effects on the body, and these effects can vary depending on the specific type of instant food and the overall dietary habits of an individual. Here are some potential effects of instant foods on the body:

1. **Nutritional Deficiency**: Many instant foods are often low in essential nutrients like vitamins, minerals, and dietary fiber. Relying on them as a significant part of your diet can lead to nutritional deficiencies over time.
2. **Weight Gain**: Some instant foods are high in calories, saturated fats, and added sugars. Frequent consumption of these foods can contribute to weight gain and obesity, which, in turn, can increase the risk of various health issues, including diabetes and heart disease.
3. **Digestive Issues**: Instant foods that are high in processed ingredients, artificial additives, and preservatives can lead to digestive discomfort, including bloating, gas, and irregular bowel movements.
4. **Increased Risk of Chronic Diseases**: A diet rich in unhealthy instant foods can increase the risk of chronic diseases such as heart disease, diabetes, and certain types of cancer due to factors like high salt intake, trans fats, and excess sugar.
5. **Blood Sugar Spikes**: Instant foods with high glycemic indexes, like sugary cereals or processed snacks, can cause rapid spikes and crashes in blood sugar levels, leading to increased feelings of hunger and cravings.
6. **High Sodium Intake**: Many instant foods are loaded with sodium, which can contribute to high blood pressure and increase the risk of heart disease. Excessive sodium intake can also lead to fluid retention and kidney problems.
7. **Lack of Satiety**: Highly processed instant foods often lack the fiber and protein needed to provide a feeling of fullness and satiety. This can lead to overeating and poor appetite control.

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8. **Decreased Overall Health**: A diet that primarily consists of instant foods may lead to a reduced overall intake of antioxidants, phytonutrients, and other health-promoting compounds found in whole, unprocessed foods.
9. **Altered Gut Microbiome**: Poor dietary choices, including frequent consumption of instant foods, can negatively affect the balance of beneficial and harmful bacteria in the gut, which plays a crucial role in overall health.

Long-Term Health Consequences: Over time, a diet rich in unhealthy instant foods can contribute to the development of chronic health conditions and reduce life expectancy.

Syllabus- Concept of slow and fast foods and impact of cooking processes like boiling, steaming, sauting, fermenting etc. (samskara) on health.

Learning objective- Describe the Slow and Fast foods. Explain the impact of cooking processes like boiling, steaming, sauting, fermenting etc. (samskara) on health and effect of instant foods like Maggi etc.

Concept of Slow and Fast Foods

The concepts of "slow foods" and "fast foods" are associated with the pace of food preparation and consumption, as well as the overall health impact of these practices. These terms are often used to describe different approaches to cooking and eating.

Slow Foods

- Slow foods refer to dishes that are prepared and consumed with care and intention. They are typically associated with traditional cooking methods, using fresh and locally-sourced ingredients.
- Slow foods are often homemade, involve time-consuming preparation, and may require skills and knowledge in the culinary arts.
- These dishes tend to emphasize whole, unprocessed, and minimally refined ingredients, making them generally healthier compared to fast foods.
- Slow foods can promote a sense of connection with the cultural and historical aspects of food, as well as with the process of cooking and sharing meals with others.

Fast Foods

- Fast foods are typically characterized by quick, convenient, and often highly processed meals. These foods are often prepared and served in a short amount of time, making them convenient for busy lifestyles.
- They are often associated with chain restaurants, takeout, and pre-packaged convenience foods.
- Fast foods are often high in calories, unhealthy fats, salt, and sugar, and they may lack essential nutrients. Their consumption is linked to various health issues, including obesity, heart disease, and diabetes.

Like Boiling, Steaming, Sauting, Fermenting Etc. (Samskara) on Health

Different cooking processes can have varying effects on the nutritional content and healthiness of food. Here's a closer look at how various cooking methods impact health:

1. **Boiling-** Boiling is a simple cooking method that involves immersing food in hot water. It is a healthier option compared to some other methods because it doesn't require the addition of significant amounts of oil or fat. Boiling can cause some nutrient loss, as water-soluble vitamins and minerals may leach into the cooking water. However, it's also an effective way to preserve nutrients when the cooking water is used in soups or stews.
2. **Steaming-** Steaming involves cooking food over boiling water, and it is a gentle method that helps to retain the nutritional content of the food. Steaming is considered one of the healthiest cooking methods as it doesn't require the use of added fats, and it preserves the natural flavors and nutrients of the ingredients.
3. **Sauting-** SautÈing typically involves cooking

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food quickly in a small amount of oil or butter. It can add flavor to food but also increases calorie content. The health impact of sautÈing depends on the type and amount of fat used. Using healthy fats like olive oil can be a better choice than saturated fats.

4. **Fermenting**- Fermentation is a preservation and flavour-enhancement technique that involves the action of beneficial micro-organisms on food. Fermented foods like yogurt, kefir, and kimchi are known for their probiotic benefits, which can promote gut health.
5. **Baking**- Baking is generally considered a healthier cooking method, especially when used for vegetables, lean meats, or whole grains. It doesn't require much added fat, and it can help retain nutrients. However, baking high-calorie, high-sugar items like cakes and pastries can contribute to health issues.
6. **Roasting**- Roasting can be a healthy option for meats and vegetables when minimal fats are used. It can enhance flavours and textures. However, if excessive fats or oils are added, it can increase the calorie content.
7. **Grilling:** Grilling can be a healthy method for cooking lean meats and vegetables, but it may produce carcinogenic compounds when fat drips onto open flames and generates smoke. To mitigate this risk, use lean cuts of meat and marinate foods.
8. **Frying:** Frying, especially deep frying, can add significant amounts of unhealthy fats and calories to food, making it a less healthy option. Shallow frying and stir-frying with minimal oil can be healthier alternatives.

Syllabus- Definition of nutraceuticals, nutrigenomics, nutrigenetics

Learning objective- Define Nutraceuticals, Nutrigenomics, Nutrigenetics

Definition of Nutraceuticals, Nutrigenomics, Nutrigenetics

Nutraceuticals- Nutraceuticals are products derived from food sources that are purported to provide extra health benefits, in addition to the basic nutritional value found in foods. Nutraceuticals are essential food constituents that provide nutritional benefits as well as medicinal effects. The benefits of these foods are due to the presence of active compounds such as carotenoids, collagen hydrolysate, and dietary fibers. Examples- Omega-3 fatty acids: Known for their heart health benefits and cognitive support, Probiotics: Beneficial bacteria that support gut health and digestion and Curcumin (from turmeric): A powerful antioxidant with anti-inflammatory properties. Nutraceuticals may include dietary supplements, functional foods, and beverages with bioactive compounds. They are believed to have a positive impact on health and well-being, as they contain biologically active compounds that may promote various health benefits.

Nutrigenomics -Nutritional genomics, also known as nutrigenomics, is a science studying the relationship between human genome, human nutrition and health. Nutrigenomics is the study of the relationship between an individual's genetic makeup (genotype) and their response to dietary nutrients (phenotype) in terms of how diet influences gene expression and metabolism. People in the field work toward developing an understanding of how the whole body responds to a food via systems biology, as well as single gene/ single food compound relationships.

Nutrigenomics is also involved in the discovery of certain genes and markers during the initial-stages of diet-related diseases. Nutrigenomics increases our knowledge about the mechanisms by which nutrition affects the metabolic pathways underlying homeostatic control. Example- Lactose intolerance, caffeine sensitivity etc.

Nutrigenetics- A branch of nutritional genomics which aims to identify genetic susceptibility to diseases and genetic variation in the effects of nutrient intake on the genome. Nutrigenetics studies the interactions between diet (type, amount, composition) and the genetic differences between individuals.

Nutrigenetics is a branch of nutritional genomics

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that focuses on how an individual's genetic makeup influences their response to specific nutrients and dietary components. It seeks to identify genetic variations that can affect how a person metabolizes, absorbs, and responds to various nutrients, and how these genetic factors may impact their dietary requirements and overall health. In other words, nutrigenetics looks at how your genes determine how your body interacts with the food you consume. Example- Phenylketonuria (PKU).

Syllabus- Concept of Viruddhaahara with classical and modern-day examples and the application of this in the prevention of diseases.

Learning objective- Explain the concept of Viruddha Ahara with classical and modern dayexamples and the application of this in the prevention of diseases

Viruddhahara (Contradictory or Incompatible Diet)

यत्किञ्चिद्दोषमांस्त्राव्य न निर्हरति कायतः ।
आहारजातं तत् सर्वहितायोएपद्यते ॥
(च.सू. 26/85)

विरुध्दमपि चाहारं विद्याद्विषगरोपमम ।
(अ.ह.सू. 7/29)

यत किञ्चित दोषमुत्क्लेष्य न हरेत तत समासतः विरुद्धं ॥
(अ.ह.सू. 7/45)

यत किञ्चित दोषमुत्क्लिश्य भुक्तं कोपात्र निहरित्
रसादीष्वयथार्थं वा तद्विकाराय कल्पते ॥
(सु.सू. 20/20)

The foods, drinks or drugs which aggravates Doshas but do not expel them out of the body is called Viruddhahara or Ahita (incompatible).

Types of Viruddhahara

यच्चापि देशकालअग्निमात्रासात्म्यानिलादिभिः ।
संस्कारतो वीर्यतश्च कोष्ठावस्थाक्रमैरपि ॥
परिहारोपचराभ्यां पाकात संयोगतोऽपि च ।
विरुद्धं तच्च न हितं हृत्संपद्विधिभिश्च यत ॥
(च.सू. 26/86-87)

Desha, Kala, Agni, Matra, Satmya, Dosha, Samskara, Virya, Koshtha, Avastha, Krama, Parhara, Upacara, Paka, Samyoga, Hruda, Sampat, Vidhi Viruddha total eighteen types of Viruddhahara.

1. Desha Viruddha-

विरुद्धं देशतस्तावद्रूक्षतीक्ष्णादि धन्वनि ।
आनूपे स्निग्धशीतादि भेषजं यत्रिषेव्यते ॥
(च.सू. 26/88)

Intake of Ruksha and Tikshna substance in Jangala Desha and Sheeta and Snigdha substance in Anupa Desha is Desha Viruddha.

Jangala Desha is dry with less water, so all living animals, human in that area are Vata predominant in nature if consume Ruksha, Tikshna food and drugs it leads aggravation of Vata.

Anup Desha is excessive water, Snigdha Guna is more, and so people are afflicted with Kapha disorder. If they consume more Snigdha, Sheeta food and medicine it leads Kapha diseases.

2. Kala Viruddha

कालतोऽपि विरुद्धं यच्छीतरुक्षादिसेवनम ।
शीतेकाले, तथेष्णो च कटुकोष्णादिसेवनम ॥
(च.सू. 26/89)

Consuming Sheeta and Ruksha food in winter season, Katu and Ushna food in summer season is Kala Viruddha.

3. Agni Viruddha

विरुद्धमनले तद्वदन्नपानं चतुर्विधे । (च.सू. 26/90)

Intake of Guru Ahara when there is Mandagni, Laghu Ahara when Agni is Teekshnagni (strong) is Agni Viruddha. Similarly intake of food at various with irregular and normal power of digestion falls under this category.

4. Matra Viruddha

मधुसर्पिः समघृतं मात्रया तद्विरुध्यते ।(च.सू. 26/90)

Taking of honey and ghee in equal quantity is Matra Viruddha.

5. Satmya Viruddha

कटुकोष्णादिसात्म्यस्य स्वादुशीतादिसेवनम ।
यत्तत सात्म्यविरुद्धं तु.....।
(च.सू. 26/91)

The use of Madhura, Sheeta food for a person,

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who is accustomed to Katu, Ushna food, it is contradictory.

6. Dosha Viruddha

.....विरुद्धंत्वनिलादिभिः ।
या समानगुणाभ्यासविरुद्धान्नौषधक्रिया ॥
(च.सू. 26/91)

Use of diet, drug and behaviour similar to Doshas in properties but adverse to the persons practice is antagonistic to Doshas.

7. Samskara Viruddha

संस्कारतो विरुद्धं तद्यद्भोज्यं विषवद्भवेत ॥
एरण्डसीसकासक्तं शिखिमांसं यथैव हि ।
(च.सू. 26/93)

Drugs and diet when prepared in particular way produce poisoning effects like in case Shikhi Mamsa (peacock meat) attached to castor stick, it is known as antagonistic in processing.

8. Virya Viruddha

विरुद्धं वीर्यतो ज्ञेयं वीर्यतः शीतलात्मकम ॥
तत संयोज्योष्णवीर्येण द्रव्येण सह सेव्यते ।
(च.सू. 26/94)

Antagonism in potency is that when Sita Virya and Ushna Virya combined together are taken. Chilacima variety of fish with milk.

9. Koshtha Viruddha

क्रूरकोष्ठस्यचात्यल्पंमन्दवीर्यमभेदनम ॥
मदुकोष्ठ गुरुचभेदनीयंतथावहु । एततकोष्ठविरुद्धंतु, ...
(च.सू. 26/95)

Administration of a mild purgative in a small dose for a person of with Krura Koshtha (hardbowel) and administration of strong purgatives food foraperson with Mrudu Koshtha (soft bowel).

10. Avastha Viruddha

.....विरुद्धंस्यादवस्थया ॥
श्रम व्यवाय व्यायामसक्तस्यानिल कोपनम् ।
निद्रालस्यालस्य भोजनं श्लेष्मकोपनम ॥
(च.सू. 26/96)

When Vata vitiating substance is given to the person, Shrama (indulge excessive) Vyayama (physical work), Vyavaya (sexual intercourse) and Kapha vitiating substance and indulge in Nidra (oversleep) and Alasya (laziness) it is antagonism is respect of health condition.

11. Krama Viruddha

यच्चानुत्सृज्य विण्मूत्रं भुङ्क्ते यश्चाबुभुक्षितः ।
तच्च क्रमविरुद्धं स्याद्यच्चातिक्षुद्वशानुगः ॥
(च.सू. 26/97)

If a person takes food before his bowel and urinary bladder are clear (empty) or when he does not have appetite or after his hunger has been highly aggravated.

12. Parihara Viruddha

परिहारविरुद्धंतु वाराहादीन्निषेव्य यत ।
(च.सू. 26/98)

Eating hot things after intake of pork etc. It is known as antagonism in indication.

13. Upachara Viruddha

सेवेतोष्णंघृतादेश्चपीत्वाशीतंनिषेवते ॥ (च.सू. 26/98)

Cold things after intake of ghee etc. It is known as antagonism in contraindication.

14. Paka Viruddha

विरुद्धं पाकतश्चापि दुष्टदोर्दारुसाधितम ।
अपक्वतण्डुलात्यर्थपक्वदग्धं च यद्भवेत ॥
(च.सू. 26/99)

Caused by variance with Paka etc. Preparation of food with bad or rotten food under cooling or ever cooling or burning during the process of preparation.

15. Samyoga Viruddha

Caused by combination of two or more substance is called Samyoga Viruddha.

संयोगतो विरुद्धं तद्यथाऽम्लं पयसा सह । (च.सू. 26/99)

Caused by combination of two or more substance is called Samyoga Viruddha. This combination results in the manifestation of specific toxic properties, which cannot be manifested by individual substances. Intake of Amla Ahara with

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milk is an example of Samyoga Viruddha.

16. Hrudaviruddha

अमनोरुचितं यच्च हृद्विरुद्धं तदुच्यते ॥
(च.सू. 26/100)

Any substance which is not pleasant in taste causes Hruda viruddha. Here Hruda one should take Mana.

सौमनस्यं बलं पुष्टिमुत्साहं हर्षणं सुखम।
स्वादु संजनयत्यन्नमस्वादु च विपर्ययम ॥
(सु.सू. 46/481)

Sushruta mentioned Asvadu and Svadu Ahara and told that tasty foods beast pleasantness of mind, Bala, Pushti, Utsaha, Harshana and Sukha. Whereas food which are not tasty gives rise to the opposite qualities.

17. Sampat Viruddha

संपद्विरुद्धं तद्विद्यादसंजातरसं तु यत ॥ (च.सू. 26/101)

The food substances which are not matured or over matured or putrefied are the example of Sampat Viruddha.

18. Vidhi Viruddha

अतिक्रान्तरसंवाऽपि विपन्नरसमेव वा।
ज्ञेयंविधिविरुद्धंतुभुज्यतेनिभृतेनयत ।
(च.सू. 26/86-101)

The rules of diet not following called Vidhi Viruddha. Example- taking meals in unhygienic place or while talking or laughing etc.

Incompatible foods

आनूपमामिषं माषक्षौद्रक्षीरविरुढकैः।
विरुध्यते सह विसैर्मूलकेन गुडेन वा ॥
विशेषात्पयसा मत्स्या मत्स्येष्वपि चिलीचिमः।
(अ.ह.सू. 7/30)

The use of Masha, Madhu, Ksheera, Virudhaka, Bisa, Mulaka, Guda is incompatible with the meat of marshy land. Especially the use of fish meat with milk is incompatible, and among fish the Cilicima varety of fish is most incompatible.

विरुद्धमम्लं पयसा सह सर्वं फलं तथा।
तद्वत् कुलत्थवरकङ्गुवल्लमकुष्टकाः ॥
(अ.ह.सू. 7/31)

The use of Amla (all sour substances) is incompatible with Paya (milk). Similarly the fruits too are incompatible with Paya (milk). The Kulattha, Varaka, Kangu, Valla and Makusthaka are also Viruddha (incompatible) with it.

भक्षयित्वा हरितकं मूलकादि पयस्त्यजेत ॥ (अ.ह.सू. 7/32)

After eating Mukaladi and Haritaka (green leafy vegetables), drinking of Paya milk should be avoided.

मत्स्यनिस्तलनस्नेहे साधिताः पिप्पलीस्त्यजेत।
कांस्ये दशाहमुषितं सर्पिरुष्णं त्वरुष्करे ॥
(अ.ह.सू. 7/37)

The Pippali processed with the residual oil or ghee of frying fish should not used in any work. The ghee placed ten days in bronze vessel and warm potent substances with Arushkara (Bhallataka) should be avoided.

ऐकध्यं पायससुराकृशराः परिवर्जयेत।
मधु सर्पिर्वसातैलपानीयानि द्विशस्त्रिशः ॥
एकत्र वा समांशानि विरुध्यन्ते परस्परम ॥
(अ.ह.सू. 7/38)

The Payasa (milk), Sura (wine) and Krushara should not be taken together. The Madhu (honey), Sarpi (ghee), Vasa (fat), Taila (oil), Paniya (water) etc. used in equal proportion together in their association of two, three or all of them is incompatible with each other.

Diseases Occurs by Intake of Viruddha Ahara

षाण्ढ्यान्ध्यवीसर्पदकोदराणां विस्फोटकोन्मादभगन्दराणाम।
मूर्च्छामदाध्मानगलग्रहाणां पाण्ड्वामयस्यामविषस्य चैव ॥
किलासकुष्ठग्रहणीगदानां शेथाम्लपित्तज्वरपीनसानाम।
सन्तानदोषश्य तथैव मृत्योर्विरुद्धमन्नं प्रवदन्ति हेतुम।
(च.सू. 26/102-103)

Intake of Viruddha Ahara is responsible for the Shandya (impotency), Andhya (blindness), Visarpa, Jalodara, Visphota, Unmada, Bhagandara, Mada, Adhmana, Galagraha, Pandu, Amaya, Kilasa, Kushtha, Grahani, Gada, Shotha, Amlapitta, Jwara, Peenasa, Santana Dosha and even Mrutyu (death).

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एषां खल्वपरेषां च वैरोधिकनिमित्तानां व्याधीनामिमे भावाः प्रतिकारा भवन्ति। तद्यथा–वमनं विरेचनं च, तद्विरोधिनां च द्रव्याणां संशमनार्थमुपयोगः, तथाविधैश्च द्रव्यैः पूर्वमभिसंस्कारः शरिरस्येति ॥ (च.सू. 26/104)

These are measures, which are used to counteract the above and the disorder caused by antagonistic. Diseases caused by the intake of Viruddha Ahara can be cured by Vamana (emesis), Virechana (purgation) or administration of antidotes and by taking prophylactic measures.

Treatment for diseases occur due to Viruddha Ahara

विरुद्धाशनजान रोगान प्रतिहन्ति विरेचनम।
वमनं शमनं चैव पूर्वं वा हितसेवनम।
सात्म्यतोऽल्पतथा वाऽपि दीप्ताग्नेस्तरुणस्य च।
स्निग्धव्यायामबलिनां विरुद्धं वितथं भवेत ॥
(च.सू. 26/105-106)

Virechana (Purgation), Vamana (emesis), Tadvirodhinam (antidotes) and Samshana (prophylaxis) these four cure the diseases caused by the intake of Viruddha Ahara. The diseases caused by Viruddhashana (incompatible food) are managed by Virechana (purgation), Vamana (emesis), Shamana (palliation) and Purva Hitasevana (prophylaxis). Viruddha Ahara does not produce any effect in Satmyata (habitual incompatable food), Alpataya (less quantity), Diptagni (strong digestive fire), Taruna (young), Snigdha (who has taken oleation), Vyayama (physical exercise) and Balavana (strong).

Non harming of Viruddha Ahara (Affectlessness of incompatible)

व्यायामस्निग्धदीप्ताग्निवयः स्थबलशालिनाम।
विरोध्यपि न पीडाये सात्म्यमल्पं च भोजनम ॥
(अ.ह.सू. 7/30)

The incompatible food does not affect the people who regularly do Vyayama (exercise), who take Snigdha Ahara and who have good Dipta Agni (digestive power), who are Vaya (young) and Balashalina (good physical and mental strength). Viruddha Ahara doesn't affect if it has become Satmya (accustomed) and taken in Alpa (little quantity).

Modern-Day Examples of Viruddhahara

1. **Burgers and Soft Drinks:** This modern combination is a classic example of incompatible foods. Burgers, especially fast-food varieties, are often high in unhealthy fats and processed ingredients, and soft drinks are loaded with sugar. Consuming them together can lead to digestive issues and potentially contribute to obesity, metabolic syndrome, and other health problems.

2. **Fruits with Protein-Rich Meals:** Mixing fruits with high-protein meals, such as having a fruit salad with a steak, may lead to digestive discomfort. The combination of rapidly digesting fruits and slower-digesting proteins can disrupt the digestive process and cause bloating or gas.

3. **Dairy and Citrus:** Mixing citrus fruits with dairy, as in the case of orange juice and milk, can curdle the milk and lead to digestive discomfort. It can also hinder calcium absorption, which is important for bone health.

4. **Caffeine and Alcohol:** Mixing caffeine, found in coffee or energy drinks, with alcohol can be harsh on the digestive system. Both substances can be dehydrating, and combining them can exacerbate dehydration and lead to discomfort and other health concerns.

5. **Meat and High-Sugar Sauces:** Some meat dishes, like barbecued meats with sugary sauces, can combine high protein with high sugar. The excessive consumption of sugary sauces with meat may contribute to weight gain and metabolic issues.

MCQ on Probiotics and Prebiotics

1. What are probiotics?
   a) Antibiotics
   b) Beneficial microorganisms
   c) Viruses
   d) Fungi
2. Which of the following is a common strain of probiotic bacteria?
   a) E. coli
   b) Listeria
   c) Bifidobacterium
   d) Salmonella

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3. What is the primary function of probiotics in the human body?
   a) To cause infections
   b) To promote the growth of harmful bacteria
   c) To support digestive health and boost the immune system
   d) To replace the need for a balanced diet
4. Probiotics are often found in which type of food or drink?
   a) Soft drinks b) Fast food
   c) Yogurt, kefir, and fermented foods
   d) Chocolate bars
5. Which of the following conditions may benefit from the use of probiotics?
   a) Broken bones b) Migraines
   c) Irritable bowel syndrome (IBS)
   d) Hearing loss
6. What is the term used to describe the number of live bacteria in a probiotic product?
   a) Shelf life b) Potency
   c) Expiration date d) Coloration
7. Which age group can benefit from probiotics?
   a) Only children b) Only the elderly
   c) People of all ages, from infants to the elderly
   d) None, as probiotics are not safe for consumption
8. True or False: Probiotics can only be obtained through dietary supplements and are not naturally present in our bodies.
9. What are prebiotics?
   a) Beneficial bacteria
   b) Nutrients that support the growth of beneficial gut bacteria
   c) Harmful microorganisms
   d) Enzymes for digestion
10. Which of the following is a common example of a prebiotic compound?
    a) Probiotics b) Sugar
    c) Fiber d) Artificial sweeteners
11. How do prebiotics differ from probiotics?
    a) Prebiotics are living microorganisms, while probiotics are non-living compounds.
    b) Prebiotics are found in fermented foods, while probiotics are found in fruits and vegetables.
    c) Prebiotics are substances that promote the growth of beneficial bacteria, while probiotics are the beneficial bacteria themselves.
    d) Prebiotics and probiotics are the same thing.
12. What is the primary role of prebiotics in the gut?
    a) To destroy harmful bacteria
    b) To replace the need for dietary fiber
    c) To support the growth of beneficial gut bacteria
    d) To reduce the absorption of nutrients
13. Which of the following foods is a good source of prebiotics?
    a) Soda b) Potato chips
    c) Whole grains and onions
    d) Candy bars
14. True or False: Prebiotics are naturally occurring in many plant-based foods, such as garlic, leeks, and bananas.
15. What health benefits are associated with the consumption of prebiotics?
    a) Improved muscle strength
    b) Enhanced memory
    c) Better gut health, improved digestion, and potential immune system support
    d) Reduced risk of sunburn
16. True or False: Prebiotics are only useful for individuals with specific health conditions and are not beneficial for the general population.

Answers

1. b) Nutrients that support the growth of beneficial gut bacteria
2. c) Fiber
3. c) Prebiotics are substances that promote the growth of beneficial bacteria, while probiotics are the beneficial bacteria themselves.
4. c) To support the growth of beneficial gut bacteria
5. c) Whole grains and onions
6. True

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7. c) Better gut health, improved digestion, and potential immune system support
8. False
9. b) Beneficial microorganisms
10. c) Bifidobacterium
11. c) To support digestive health and boost the immune system
12. c) Yogurt, kefir, and fermented foods
13. c) Irritable bowel syndrome (IBS)
14. b) Potency
15. c) People of all ages, from infants to the elderly
16. False

MCQ on Nutrition and Food

1. The recommended daily energy intake of an adult pregnant woman with heavy work is:
   a) 2100 kcal b) 2500 kcal
   c) 3200 kcal d) 2900 kcal
2. Extra calories required by lactating mother during first six months over and above daily requirement is:
   a) 550 kcal b) 400 kcal
   c) 300 kcal d) 250 kcal
3. The recommended daily energy intake of an adult woman with heavy work is:
   a) 1800 b) 2100
   c) 2300 d) 2900
4. For an adult Indian male the daily requirement of protein is expressed as:
   a) 0.5 g/kg body weight
   b) 0.75 g/kg body weight
   c) 1 gm/kg body weight
   d) 1.50 g/kg body weight
5. In 13-15 year female child, recommended daily protein intake (gm/kg/day) is:
   a) 0.68 b) 0.95
   c) 1 d) 1.33
6. Energy requirement in late pregnancy for a moderate worker is:
   a) 2500 cal b) 1400 cal
   c) 1000 cal d) 500 cal
7. Indian reference man:
   a) 55 kg b) 60 kg
   c) 65 kg d) 70 kg
8. Reference weight of Indian men and women is:
   a) 60 and 50 kg b) 55 and 50 kg
   c) 65 and 55 kg d) 45 and 50 kg
9. Extra calories per day in lactating mothers in first six months:
   a) 300 b) 500
   c) 600 d) 1000
10. Which of the following trace element cannot be Completely supplemented by diet during pregnancy:
    a) Fe b) Ca++
    c) Zn d) Mn
11. Additional Calories regarding for lactation:
    a) 550 b) 440
    c) 300 d) 130
12. According to ICMR the 'Cereals and pulses' requirement for a sedentary strict vegetarian male is?
    a) 200 and 50 grams b) 300 and 60 grams
    c) 460 and 40 grams d) 560 and 50 grams
13. Calories required for 0-6 m infant is Kcal/kg):
    a) 150 b) 100
    c) 300 d) 400
14. Which one of the following is the best indicator of protein quality for recommending the dietary protein requirement?
    a) Protein-efficiency ratio
    b) Biological value
    c) Digestibility coefficient
    d) Net protein utilization
15. The optimum calories to be provided by proteins should be:
    a) 5-10% b) 10-15%
    c) 15-20% d) 20-30%
16. Qualitative assessment of proteins can be done by:
    a) Net Protein Utilization
    b) Protein Energy ratio
    c) Amount of proteins consumed daily
    d) Weight gained on a monthly basis

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17. Conditionally Essential amino acids are:
    a) Leucine & Lysine
    b) Histidine & Arginine
    c) Tyrosine & Cysteine
    d) Phenylalanine & Tryptophan
18. Highest protein content is in:
    a) Red gram b) Black gram
    c) Bengal gram d) Soya bean
19. Limiting Amino acids in wheat are:
    a) Methionine and Lysine
    b) Lysine and threonine
    c) Threonine and methionine
    d) Arginine and lysine
20. Pulse protein is deficient in which of the following Essential Amino Acid?
    a) Lysine b) Methionine
    c) Threonine d) Tryptophan
21. All are true about Net protein utilization NPU) except:
    a) Defined as Nitrogen retained by Nitrogen consumed X 100
    b) Good for estimating protein quality
    c) Egg has the highest NPU value
    d) 1 gram protein is equivalent to 1 gram Nitrogen Nutrition and Health
22. What is known as "poor man's meat"?
    a) Milk b) Pulse
    c) Fish d) Egg
23. Semi essential amino acids are:
    a) Tryptophan, Tyrosine
    b) Leucine, Lysine
    c) Histidine, Arginine
    d) Phenylalanine, Valine
24. Lysine is deficient in:
    a) Pulse b) Wheat
    c) Both of the above d) None of the above
25. Biological value is maximum of:
    a) Egg b) Milk
    c) Soyabean d) Pulses
26. Pulses are deficient in:
    a) Lysine and threonine
    b) Lysine and tryptophan
    c) Methionine and cysteine
    d) Lysine and methionine
27. Pulse proteins are poor in:
    a) Methionine b) Lysine
    c) Threonine d) Alanine
28. The protein quality indicator adopted by ICMR in recommending dietary protein requirement is:
    a) Amino acid score
    b) Net protein utilization
    c) Biological value
    d) Protein efficiency ratio
29. Among the pulses, the highest quantity of protein is present in:
    a) Green gram b) Red gram
    c) Soyabean d) Black gram
30. Which of the following has highest protein content:
    a) Mutton b) Soyabean
    c) Egg d) Milk
31. Lysine is deficient in:
    a) Pulse b) Wheat
    c) Both d) None
32. Amino acid lesser in rice is:
    a) Lysine b) Methionine
    c) Both d) None
33. Biological value is maximum of:
    a) Egg b) Milk
    c) Soyabean d) Pulses
34. Net protein utilization is highest in:
    a) Egg b) Wheat
    c) Milk d) Fish
35. The protein quality indicator adopted by ICMR in recommending dietary protein requirements is:
    a) Amino acid score
    b) Net protein utilization
    c) Biological value
    d) Protein efficiency ratio
36. Highest content of protein is found in:
    a) Soya bean b) Red gram
    c) Bengal gram d) Black gram

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37. The limiting amino acid in the wheat is:
a) Leucine b) Lysine
c) Methionine d) Tryptophan

38. The limiting amino acids in wheat is:
a) Lysine and threonine
b) Lysine and tryptophan
c) Lysine and Leucine
d) Tyrosine and tryptophan

39. The limiting amino acid in wheat is:
a) Alanine & threonine
b) Lysine & theronine
c) Alanine
d) Tyrosine & Methionine

40. Protein content is highest in:
a) Bengal gram b) Lentils
c) Pulses
d) Soyabean Nutrition and Health

41. Reference protein is:
a) Milk b) Meat
c) Egg d) Pulses

42. Maize is deficient in:
a) Methionine b) Lysine
c) Lucine d) All

43. Daily requirement of protein is:
a) 1 g/kg body weight
b) 1.2 g/kg body weight
c) 0.9 g/kg body weight
d) 1.5 g/kg body weight

44. Which method of assessment of quality of proteins gives more complete assessment of protein quality?
a) Biological value
b) Net protein utilization
c) Digestability co-efficient
d) Amunoacid score

45. Biological value of Rice protein is:
a) 52 b) 67
c) 80 d) 100

46. Reference protein is:
a) Egg b) Milk
c) Pulses d) Fish

47. Which is known as reference protein?
a) Soyabean b) Milk
c) Orange d) Potato

48. The highest percentage of polyunsaturated fatty acids is present in:
a) Groundnut oil b) Soya bean oil
c) Margarine d) Palm oil

49. Suggested intake of dietary fat per day in pregnancy is:
a) 20 gms b) 22 gms
c) 30 gms d) 45 gms

50. Most important Essential Fatty Acid is:
a) Linoleic Acid b) Linolenic Acid
c) Arachidonic Acid d) Eicosapentanoic Acid

51. Rank the food items in descending order of their energy yield per 100 grams Carbohydrate-A, Fats – B, Alcohol– C:
a) A B C b) B C A
c) C A B d) C B A

52. Cereals and proteins are considered complementary since:
a) Cereals are deficient in methionine
b) Cereals are deficient in methionine and pulses are deficient in lysine
c) Cereals are deficient in lysine and pulses are deficient in methionine
d) Both cereals and pulses contain threonine

53. Highest fat content is present in:
a) Rice b) Wheat
c) Bajra d) Jowar

54. The highest content of saturated fatty acid is in:
a) Palm oil b) Butter
c) Coconut oil d) Margarine

55. Which among the following is a cardio-protective fatty acid?
a) Palmitic acid b) Stearic acid
c) Omega-3 fatty acids
d) Oleic acid

56. Amount of cereals provided in Mid-day meal program is:
a) 50 grams b) 75 grams
c) 100 grams d) 150 grams

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57. Low glycemic index is for:
a) Sucrose b) Potato
c) White bread d) Fruits

58. Linoleic acid is maximum in:
a) Groundnut oil b) Safflower oil
c) Mustard oil d) Coconut oil

59. Richest source of cholesterol is
a) Egg b) Hydrogerated oil
c) Butter d) Cheese

60. Linoleic acid is present maximally in:
a) Safflower oil b) Sunflower oil
c) Coconut oil d) Palm oil

61. Linoleic acid highest in:
a) Safflower oil b) Corn oil
c) Sunflower oil d) Coconut oil

62. Maximum amount of essential fatty acids is found in:
a) Coconut oil b) Sunflower oil
c) Mustard oil d) Groundnut oil

63. Highest amount of linoleic acid is in:
a) Sunflower b) Safflower oil
c) Corn oil d) Coconut oil

64. What % of total calorie should be from Fat & EFA:
a) 10-30 b) 7-15
c) 65-80 d) 1-7

65. Casal's Necklace is seen in deficiency of:
a) Vitamin A b) Vitamin B3
c) Vitamin B6 d) Vitamin D

66. Recommended Daily Allowance of free folate in pregnancy is:
a) 500 mcg b) 150 mcg
c) 300 mcg d) 400 mcg

67. Under National Programme for Prevention of Nutritional Blindness, a child in the age group of 6-11 months is given a mega dose of vitamin A equal to:
a) 50,000 IU b) 1 Lakh IU
c) 1.5 Lakh IU d) 2 Lakh IU

68. First clinical sign of Vitamin-A deficiency is:
a) Night blindness b) Conjunctival xerosis
c) Bitot's spots d) Keratomalacia

69. Vitamin-A solution contains:
a) 25,000 IU per ml b) 50,000 IU per ml
c) 1,00,000 IU per ml d) 2,00,000 IU per ml

70. 'Burning Sole Syndrome' is seen in deficiency of:
a) Riboflavin b) Pyridoxine
c) Pantothenic acid d) Vitamin B12

71. Niacin deficiency can result in:
a) Pellagra b) Anemia
c) Peripheral neuropathy
d) Beri beri

72. Incidence of Bitot spots to label it as a public health problem is:
a) 0.1% b) 0.5%
c) 1% d) 5%

73. Vitamin A deficiency can cause all of the following except:
a) Night blindness b) Seborrheic dermatitis
c) Respiratory infection
d) Bitot spots

74. Daily requirement of Vitamin K
a) 3 mg/kg b) 0.3 mg/kg
c) 0.03 mg/kg d) 30 mg/kg

75. Vitamin A deficiency in 18 months old child what is recommended dose:
a) 200 IU b) 2,000 IU
c) 200,000 IU d) 20,000 IU

76. Vitamin A requirement in infant is:
a) 350 mcg b) 600 mcg
c) 800 mcg d) 1000 mcg

77. Vitamin D is maximum in:
a) Milk b) Fish fat
c) Eggs d) Cod liver oil

78. Pellagra in Jowar eating population is due to:
a) Niacin in bound form
b) Deficiency of Tryptophan
c) Excess of Leucine
d) High consumption of milk and milk products

79. Physiologically most active form of Vitamin D is:
a) Calciferol b) Cholecalciferol
c) Ergocalciferol d) Calcitriol

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80. Bitot's spots are seen in:
a) Conjunctiva b) Cornea
c) Retina d) Vitreous

81. In Xeropthalmia, what is X1B:
a) Conjunctival xerosis
b) Bitot's spot
c) Corneal xerosis d) Corneal ulcer

82. Earliest feature of vitamin A deficiency is:
a) Dryness of conjunctiva
b) Nyctalopia
c) Keratomalacia d) Hyphema

83. Earliest feature of vitamin A deficiency is:
a) Dryness of conjunctiva
b) Nyctalopia
c) Keratomalacia d) Hyphema

84. Vitamin E rich Foods are:
a) Sunflower oil b) Wheat germ oil
c) Soya bean d) All of the above

85. Daily requirement of vitamin D in children:
a) 100 IU b) 200 IU
c) 400 IU d) 600 IU

86. Vitamin C content of which of the following is >5 mg per 100 grams?
a) Human milk b) Dates
c) Egg d) Sitaphal

87. Vitamin D is least in:
a) Milk b) Eggs
c) Fish fat d) Shark liver oil

88. Deficiency of folic acid produces:
a) Carcinoma stomach
b) Spinal degeneration
c) Changes in central nervous system
d) Megaloblastic anaemia

89. In measles which vitamin deficiency occurs:
a) Vitamin A b) Vitamin B
c) Vitamin C d) Vitamin D

90. Richest source of vitamin B1:
a) Rice b) Milk
c) Egg d) Groundnut

91. What is the characteristic feature of Vitamin "A" deficiency?
a) Bitot's spot b) Koplik's spots
c) Erythema marginatum
d) Aschoff's nodules

92. Peripheral neuritis is deficiency sign of:
a) Folic acid b) Niacin
c) Thiamine d) Tocopherol

93. Which of the following is NOT a criteria for determining xerophthalmia problem in the community?
a) Bitot's spots 0.05%
b) Corneal xeroxis 0.01%
c) Corneal ulcer 0.05%
d) Serum retinoal level less than 10 mcg/dl 10%

94. Which of the Following vitamin deficiency diseases occurs in maize eating population?
a) Beriberi
b) Megaloblastic anaemia
c) Pellagra d) Night blindness

95. Bitot's spots are found in:
a) Measles b) Mumps
c) Vit. A deficiency d) Diphtheria

96. Vit. A requirement in adult male is Microgram per day):
a) 400 b) 600
c) 800 d) 1000

97. Highest amount of vit. C is found in:
a) Orange b) Lemon
c) Indian goose berry d) Grapes

98. Best test to detect iron deficiency in community is:
a) Serum transferrin b) Serum ferritin
c) Serum iron d) Hemoglobin

99. An adult pregnant female is termed anemic if her hemoglobin venous blood) is:
a) Less than 11 g/dl b) Less than 12 g/dl
c) Less than 13 g/dl d) Less than 14 g/dl

100. Iron absorption from habitual Indian diets is approx:
a) < 5 % b) 15 –20%
c) 40 –50% d) 70 ≥ 80%

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101. Most sensitive tool for evaluating iron status of the body is:
a) Hb level b) Serum iron
c) Serum transferring saturation
d) Serum ferritin

102. Lowest iron content is present in:
a) Milk b) Liver
c) Meat d) Fist

103. Oral iron pills or iron injections must be taken along with:
a) High doses of Vitamin A
b) High doses of Vitamin C
c) High doses of Essential fatty acids
d) High doses of Vitamin D

104. Total Iron requirement in pregnancy:
a) 1000 mg b) 35 mg
c) 500 mg d) 800 mg

105. Poor man's iron source is:
a) Almond b) Grapes
c) Soya d) Jaggery

106. Fluoride content in drinking H2O normally safe is:
a) 0.5-0.8 mg/l b) 0.8-1.0 mg/l
c) 0.2-0.8 mg/l d) 0.2-0.5 mg/l

107. Dental fluorosis is best seen in:
a) Central & Lateral Incisors
b) Central Incisors & 1st Molars
c) 1st & 2nd Molars d) Canines

108. 'Twin fortified salt' contains:
a) Iodine + Fluorine b) Iodine + Calcium
c) Iodine + Iron d) Iodine + Chlorine

109. 1 gram of 'Twin fortified salt' provides:
a) 1 mcg Iodine + 40 mg Iron
b) 40 mcg Iodine + 40 mg Iron
c) 1 mcg Iodine + 1 mg Iron
d) 40 mcg Iodine + 1 mg Iron

110. Recommended Iodine dose in pregnancy is:
a) 15 mcg b) 100 mcg
c) 150 mcg d) 250 mcg

111. Poor source of Iron is in:
a) Butter b) Green leafy vegetable
c) Jaggery d) Meat

112. How much amount of energy is yielded by one ml of alcohol in the body?
a) 1 cal b) 4 cal
c) 7 cal d) 9 cal

113. Daily requirement for Dietary Fibre by an adult is approx:
a) 1 gm b) 4 gms
c) 40 gms d) 100 gms

114. Which of the following is the non-essential micronutrient?
a) Iron b) Manganese
c) Lead d) Sodium

115. Adult non-pregnant female requires, calcium per day:
a) 400 mg b) 600 mg
c) 800 mg d) 1000 mg

116. Daily calcium requirement of infants is:
a) 300 mg b) 500 mg
c) 600 mg d) 1200 mg

117. RDA of calcium in normal adult male is:
a) 800 mg b) 600 mg
c) 1200 mg d) 100 mg

118. Daily elemental calcium requirement for an elderly woman is:
a) 1200 mg b) 300 mg
c) 2000 mg d) 2500 mg

119. Which of the following trace element has vitamin E like action:
a) Selenium b) Cheomicin
c) Copper d) Zinc

120. The daily requirement of Iodine for adults is placed at:
a) 10 mg b) 100 mg
c) 50 mg d) 150 microgram

121. The recommended level of fluorides in drinking water in this Country is accepted as:
a) 0.5 to 0.8 mg per litre
b) 1 to 2 mg per litre
c) 3 to 6 mg per litre
d) 7 to 12 mg per litre

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122. The level of fluorine in drinking water highly associated with dental fluorosis is:
a) 0.5 mg/L b) 1.0 mg/L
c) 1.5 mg/L d) 2.0 mg/L

123. In drinking water fluoride levels should be less than _____mg/L:
a) 1.5 b) 1
c) 0.5 d) 0.1

124. In drinking water recommended fluoride level is _____ ppm:
a) 0.5 b) 0.5-0.8
c) 1.5 d) 1.1

125. Iodine requirement of adult male is Micro gram/day):
a) 150 b) 300
c) 500 d) 700

126. Defloridation of water is done by which technique:
a) Nalgonda b) Nagpur
c) Patna d) Kasauli

127. Water fluoride is removed by:
a) Boiling b) Nalgonda technique
c) Patna. Technique d) Filtration

128. Daily requirement of Iodine is:
a) 50-100 b) 100-200
c) 200-300 d) 25-50

129. Micronutrient associated with rash and diarrhea:
a) Manganese b) Copper
c) Zinc d) Iron

130. Highest calcium concentration is present in:
a) Dates b) Guava
c) Amla d) Mango

131. Zinc deficiency is characterized by:
a) Sexual infantilism b) Poor growth
c) Poor wound healing
d) All of the above

132. Copper deficiency is characterized by:
a) Myelopathy b) Neutropenia
c) Anemia d) All of the above

133. Egg are "reference protein" because:
a) High caloric content
b) Increased protein/100 gms
c) Increased biological value and +NPU
d) Decreased digestibility coefficient

134. Egg is poor in:
a) Proteins
b) Carbohydrate & Vitamin C
c) Calcium & Iron d) Fats

135. NPU value for Egg is:
a) 140 b) 96
c) 81 d) 52

136. Egg has all vitamins except:
a) B1 b) B6
c) C d) E

137. Egg is deficient in which of the following:
a) Fat b) Protein
c) Carbohydrate d) Vitamin

138. Egg are "reference protein" because:
a) High caloric content
b) Increased protein/100 gms
c) Increased biological value and +NPU
d) Decreased digestibility coefficient

139. Egg is ideal protein because it has:
a) High digestibility
b) It has best quality of protein
c) High proteins
d) High protein and fats

140. Egg lacks the following:
a) Protein b) Cholesterol
c) Carbohydrate d) Vitamins

141. In Egg, Egg white contributes:
a) 50% b) 58%
c) 30% d) 70%

142. One egg yield about kcal of energy:
a) 50 b) 60
c) 70 d) 80

143. What is not found in egg?
a) Cholesterol b) Vit. C
c) Calcium d) Fat

144. Egg has all vitamin except:
a) B1 b) B6
c) C d) E

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145. Pasteurization by Holder method is heating milk at:
a) 60°C for 45 minutes
b) 65°C for 30 minutes
c) 100°C for 15 minutes
d) 136°C for 15 minutes

146. Which one of the following is NOT used in testing for adequate pasteurization of milk?
a) Phosphatase test b) Coliform count
c) Standaed plate count
d) Methylene blue reduction test

147. Milk is a good source of all vitamins except:
a) Vitamin A b) Vitamin B
c) Vitamin C d) Vitamin D

148. Level of proteins in human milk per 100 ml) is:
a) 0.5 gms b) 2.6 gms
c) 1.1 gms d) 4.7 gms

149. The following tests are used to check the efficiency of pasteurization of milk except:
a) Phosphatase test b) Standard plate count
c) Coliform count
d) Methylene blue reduction test

150. True about cow's milk are all except:
a) Cow's milk contains 80% whey protein and not casein
b) Has more protein than breast milk
c) Has more K+ and Na+ than breast milk
d) Has less carbohydrates than mothers milk

151. Pasteurised milk is most commonly tested by:
a) Phosphatase test b) Coliform test
c) Catalase test d) Oxidase test

152. Milk transmits all except:
a) Q fever b) Typhoid fever
c) Brucellosis d) Endemic typhus

153. Rice is poor in all except:
a) Calcium b) Iron
c) Vitamins A, D, Cd) Lysine

154. Soyabean contains protein to the tune of:
a) 20 % b) 40 %
c) 60 % d) 80 %

155. Fish is the source of all except?
a) Iron b) Iodine
c) Vitamin A d) Phosphorus

156. One of the following contains maximum calcium:
a) Rice b) Wheat
c) Ragi d) Jowar

157. Paraboiling of rice reduces:
a) Beriberi b) Pellagra
c) Dermatitis d) All of the above

158. Dates are rich source of:
a) Calcium b) Iron
c) Vitamin C d) Carotene

159. Highest calorie content is found in:
a) Banana b) Apple
c) Guava d) Orange

160. The food item rich in calcium is:
a) Rice b) Wheat
c) Jowar d) Ragi

161. An amino acid found in excess in some strains of maize is:
a) Leucine b) Valine
c) Lysine d) Tryptophand Health

162. Lysine is deficient in:
a) Cereals b) Pulses
c) Jowar d) Soyabean

163. Sorghum is pellagrogenic due to excess content of:
a) Lysin b) Threonine
c) Leucine d) Tryptophan

164. Maize is pellagrogenic due to excess of:
a) Lysine b) Leucine
c) Tryptophan d) Methionine

165. Maximum calories per 100 gm are in:
a) Jaggery b) Pulsles
c) Green vegetables d) Egg

166. Ingestion of which of the following can result in ergotism?
a) Bajra b) Maize
c) Kesari dal d) Mustard

167. Lathyrism is due to consumption of:
a) Red gram dhal
b) Contaminated ground nuts

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c) Bengal gram dhal
d) Khesari dhal

168. Lathyrism results due to:
a) Aflatoxin b) BOAA
c) Pyruvic acid d) Sanguinarine

169. Neuro lathyrism results due to:
a) Aflatoxin b) BOAA
c) Pyruvic acid d) Sanguinarine

170. Toxin present in lathyrus sativa:
a) Pyrazolone alkaloids
b) Sanguinarine
c) BOAA d) Aflatoxin

171. Lathyrism from Khesari dal can be prevented by which process:
a) Parboiling b) Heating
c) Soaking d) Filtration

172. All are examples of Food Fortification except:
a) Iodisation of salt
b) Vitamin A in Vanaspati
c) Fluoridation of water
d) Saffron colour in milk

173. Nalgonda Technique is used for:
a) Chlorination of water
b) Defluoridation of water
c) Iodisation of salt
d) Detoxification of contaminated mustard oil

174. Which of the following poisonings can result in spastic paraplegia?
a) Lathyrus b) Strychnine
c) Sanguinarine d) Organophosphates

175. Pellagra:
a) Is due to pyridoxine deficiency
b) Occurs with diet chiefly on maize
c) Night blindness is a presenting feature
d) Causes high output cardiac failure

Answers of MCQ on Nutrition and Food

1. Ans. c) 3200 kcal
2. Ans. a) 550 kcal
3. Ans. d) 2900
4. Ans. c) 1 gm/kg body weight Now 0.83g/kg by body weight)
5. Ans. b) 0.95 (0.86 Actual Value)
6. Ans. a) 2500 cal
7. Ans. b) 60 kg
8. Ans. a) 60 and 50 kg
9. Ans. c) 600
10. Ans. a) Fe
11. Ans. a) 550 Now 600)
12. Ans. c) 460 and 40 grams
13. Ans. b) 100 Now 92)
14. Ans. d) Net protein utilization
15. Ans. c) 15-20%
16. Ans. a) Net Protein Utilization
17. Ans. c) Tyrosine & Cysteine
18. Ans. d) Soya bean
19. Ans. b) Lysine and threonine
20. Ans. b) Methionine
21. Ans. d) 1 gram protein is equivalent to 1 gram Nitrogen
22. Ans. b) Pulses
23. Ans. c) Histidine, Arginine
24. Ans. b) Wheat
25. Ans. a) Egg
26. Ans. c) Methionine and cysteine
27. Ans. a) Methionine
28. Ans. b) Net protein utilization
29. Ans. c) Soyabean
30. Ans. b) Soyabean
31. Ans. b) Wheat
32. Ans. a) Lysine
33. Ans. a) Egg
34. Ans. a) Egg
35. Ans. b) Net protein utilization
36. Ans. a) Soya bean
37. Ans. b) Lysine
38. Ans. a) Lysine and threonine
39. Ans. b) Lysine & threonine
40. Ans. d) Soyabean
41. Ans. c) Egg
42. Ans. b) Lysine
43. Ans. a) 1 g/kg body weight Now 0.83)
44. Ans. b) Net protein utilization
45. Ans. b) 67
46. Ans. a) Egg
47. Ans. b) Milk

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48. Ans. b) Soya bean oil
49. Ans. c) 30 gms
50. Ans. a) Linoleic Acid
51. Ans. b) B C A
52. Ans. c) Cereals are deficient in lysine and pulses are deficient in methionine
53. Ans. c) Bajra
54. Ans. c) Coconut oil
55. Ans. c) Omega-3 fatty acids
56. Ans. c) 100 grams
57. Ans. d) Fruits
58. Ans. b) Safflower oil
59. Ans. a) Egg
60. Ans. a) Safflower oil
61. Ans. a) Safflower oil
62. Ans. b) Sunflower oil
63. Ans. b) Safflower oil
64. Ans. a) 10-30
65. Ans. b) Vitamin B3
66. Ans. a) 500 mcg
67. Ans. b) 1 Lakh IU
68. Ans. b) Conjunctival xerosis
69. Ans. c) 1,00,000 IU per ml
70. Ans. c) Pantothenic acid
71. Ans. a) Pellagra
72. Ans. b) 0.5%
73. Ans. b) Seborrheic dermatitis
74. Ans. c) 0.03 mg/kg
75. Ans. c) 200,000 IU
76. Ans. a) 350 mcg
77. Ans. d) Cod liver oil
78. Ans. c) Excess of Leucine
79. Ans. d) Calcitriol
80. Ans. a) Conjunctiva
81. Ans. b) Bitot's spot
82. Ans. a) Dryness of conjunctiva
83. Ans. a) Dryness of conjunctiva
84. Ans. d) All of the above
85. Ans. b) 200 IU
86. Ans. d) Sitaphala
87. Ans. a) Milk
88. Ans. d) Megaloblastic anaemia
89. Ans. a) Vitamin A
90. Ans. d) Groundnut
91. Ans. a) Bitot's spot
92. Ans. c) Thiamine
93. Ans. a) Bitot's spots 0.05%
94. Ans. c) Pellagra
95. Ans. c) Vit. A deficiency
96. Ans. b) 600
97. Ans. c) Indian goose berry
98. Ans. b) Serum ferritin
99. Ans. a) less than 11 g/dl
100. Ans. a) < 5%
101. Ans. d) Serum ferritin
102. Ans. a) Milk
103. Ans. b) High doses of Vitamin C
104. Ans. a) 1000 mg
105. Ans. d) Jaggery
106. Ans. a) 0.5-0.8 mg/l
107. Ans. b) Central Incisors & 1st Molars
108. Ans. c) Iodine + Iron
109. Ans. d) 40 mcg Iodine + 1 mg Iron
110. Ans. d) 250 mcg
111. Ans. a) Butter
112. Ans. c) 7 cal
113. Ans. c) 40 gms
114. Ans. c) Lead
115. Ans. b) 600 mg
116. Ans. b) 500 mg
117. Ans. b) 600 mg
118. Ans. a) 1200 mg
119. Ans. a) Selenium
120. Ans. d) 150 microgram
121. Ans. a) 0.5 to 0.8 mg per litre
122. Ans. d) 2.0 mg/L
123. Ans. b) 1
124. Ans. b) 0.5-0.8
125. Ans. a) 150
126. Ans. a) Nalgonda
127. Ans. b) Nalgonda technique
128. Ans. b) 100-200
129. Ans. c) Zinc
130. Ans. a) Dates
131. Ans. d) All of the above
132. Ans. d) All of the above
133. Ans. c) Increased biological value and +NPU
134. Ans. b) Carbohydrate & Vitamin C
135. Ans. b) 96
136. Ans. c) C
137. Ans. c) Carbohydrate

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138. Ans. c) Increased biological value and +NPU
139. Ans. b) It has best quality of protein
140. Ans. c) Carbohydrate
141. Ans. b) 58%
142. Ans. c) 70
143. Ans. b) Vit. C
144. Ans. c) C
145. Ans. b) 65ãC for 30 minutes
146. Ans. d) Methylene blue reduction test
147. Ans. c) Vitamin C
148. Ans. c) 1.1 gms
149. Ans. d) Methylene blue reduction test
150. Ans. a) Cow's milk contains 80% whey protein and not casein
151. Ans. a) Phosphatase test
152. Ans. d) Endemic typhus
153. Ans. d) Lysine
154. Ans. b) 40%
155. Ans. b) Iodine
156. Ans. c) Ragi
157. Ans. a) Beriberi
158. Ans. b) Iron
159. Ans. a) Banana
160. Ans. d) Ragi
161. Ans. a) Leucine
162. Ans. a) Cereals
163. Ans. c) Leucine
164. Ans. b) Leucine
165. Ans. a) Jaggery
166. Ans. a) Bajra
167. Ans. d) Khesari dhal
168. Ans. b) BOAA
169. Ans. b) BOAA
170. Ans. c) BOAA
171. Ans. a) Parboiling
172. Ans. d) Saffron colour in milk
173. Ans. b) Defluoridation of water
174. Ans. a) Lathyrus
175. Ans. b) Occurs with diet chiefly on maize

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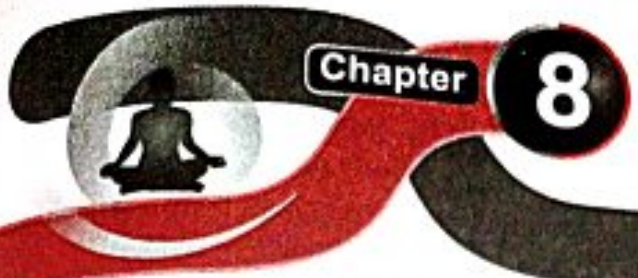

Chapter 8

Rasayana for Swastha

Syllabus

Definition of Rasayana and benefits of Rasayana. Classification and types of Rasayana with examples. Urjaskara Rasayanas as per age and occupations /Activities. Antioxidant & immunomodulatory effects of Rasayana with reference to research articles. Importance of lifestyle counselling with its methods.

Learning objectives

1. Explain the importance of lifestyle counselling with its methods
2. Define Rasayana and mention the benefits of Rasayana
3. Classify the types of Rasayana with examples
4. Explain Urjaskara Rasayanas as per age and occupations/Activities
5. Explain the antioxidant & immunomodulatory effects of Rasayana with reference to research articles

Total - 2 hours (Lecture :02 hour, Non-lecture: 02 hours)
MCQ- Yes- SAQ (5 Marks)- Yes- LAQ (10 Marks)- No

Every individual in this world want to live healthy for a long period of time. Even though the term Swastha is sufficient to cover all concepts of health, for the maintenance of this status Rasayana for Swastha is recommending. Rasayana Chikitsa i.e. the rejuvenation therapy is explained in Ayurveda for the healing and rejuvenation of living tissues.

Rasayana is one among the eight clinical specialties of Ayurveda. It is not only a drug therapy but a specialized procedure practiced in the form of rejuvenate recipes, dietary regimen and special health promoting conduct and Behavior i.e. Achara-Rasayana.

Rasayana means the way to attain excellent Rasa i.e., to attain longevity, memory, intelligence, youthful age, excellence of luster, complexion and voice, optimum strength of physique and sense organs, successful words, respect, ability and brilliance along with freedom from ailments.

Historical Aspects

Rasayana is described elaborately in the four Padas of the 1st chapter in Cikistha Sthana of charka Samhitha. In Susrutha Samitha the references are available in 27-29 chapters of Chikista Sthana & in Astangahrudya of Vagbhata from Uttara Sthana.

Rasayana Nirukti

Etymologically the term Rasayana comprises of components, vis. Rasa and Ayana.

Rasa - Dhatu and Ayana - Movement

Which help the Rasa Raktadi Dhatus to reach their destination proper-Shabdha Kalpa Druma.

Rasa is that which is getting transformed day by day- Amarakosha

Rasayana is nutritional transportation in the body. It refers to the acquisition, movement or circulation of nutrition to nourish the body and enrich tissue perfusion.

Definition of Rasayana and Benefits of Rasayana

लाभोपायोहिशस्तानांरसादिनांरसायनम ।
(च.चि. 1/1/7, अ.ह.उ. 39/1)

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A procedure by which Rasadisapta Dhatu is sanctified in all respect through proper nourishment is known as Rasayana.

Acharya Sushruta while making a reference to the branch, terms it to be the science of Rejuvenation, which is the attainment of longevity, possessing anabolic capacity improvement of mental faculty and also gaining immunity against and overcoming any existing diseases.

Dalhana defines Rasayana as "A therapy through which the drugs prevents the senility, cures the diseases, preserve the youthful state and act as restorative."

यज्जराव्याधिविध्वंसिवयः स्तम्भकरम्तथा ।
चक्षुष्यंबृहणंवृष्यंभेषजंतद्रसायनम ॥

(भा.प्र.)

A therapy which stops or prevents the senility and cures the diseases is known as Rasayana.

रसायनञ्चतज्ज्ञेययज्जराव्याद्विजनाशनम ।
यथाअमृतारुदन्तीचगुग्गुलुञ्चहरितकी ॥

(शा.सं.प्र.ख. 4/23)

Rasayana as which does the Vyadhi Nashana is nothing but Rasayana.

देहस्येन्द्रियदन्तानांद्रढिकरणमेवच ।
वलिपलितखलित्यवर्जनोऽपिचक्रिया ॥
पूर्ववैद्यप्रणीतंहितद्रसायनमुच्यते ।

(हा.सं. 1/23)

A therapy which strengthens the body, organ system, and tooth and prevents the wrinkling of skin, whitening hair, loss of hair, baldness is known as Rasayana.

Benefits of Rasayana

According Charaka Acharya :

1. Promotes Longevity of life
2. Improved mental and intellectual competence.
3. Provides immunity against diseases resulting in positive health
4. Delays ageing process by preserving Youthfulness
5. Improvement in the complexion and luster of the skin (Prabha and Kanti)
6. Enrichment in 'Swara' (voice)
7. Excellence of body glow
8. Optimization of strength of body and indriyas (motor and sense organs)
9. Person becomes more helpful and generous
10. Physical and mental strength improvement
11. Command over speech/ infallibility of speech (Vaksiddhi)
12. Attaining Humbleness and politeness (Pranati)
13. Proper, accurate balanced and premium production of all the Sharir Dhatus (Right from Rasa Dhatu to the Shurka dhatu) Rasayana Prayojana

Effect of Rasayana-Rasayana agent promotes nutrition through one of the following three modes:

1. Direct enrichment of the nutritional quality of Rasa (nutritional plasma)eg: Shatavarai, milk, ghee etc.
2. Promoting nutrition through improving Agni (digestion & metabolism) - eg: Bhallataka, Pippali etc.
3. Promoting the competence of Srotas (microcirculatory channels in the body) – eg: Guggulu.

Chakrapani explains that a person undergoing Rasayana may attain healthy ageing (Sukhayu and longevity that exceeds 100 yrs. by preventing and cure of senility).

Dalhana explains the merits and uses of Rasayana as, it increases and maintains the optimum level of all body elements prevents and cures senility (Jarapaharana) diseases. (Rogapaharana)

Indu the commentator of Astanga Sangraha adds one more action to above list. He says that Rasayana has cosmetic effect on the body and complexion. Thus embellishes and glorifies the body beauty.

The rejuvenator group of herbs traditionally termed as 'Rasayana' has micronutrients which improve health, immunity, vigor, vitality and give longevity as well as protection against stress. All these actions of certain Rasayana herbs have now

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been scientifically proved through experimental as well as clinical studies.

Probable Mode of Action of Rasayanna

Acharya Sushruta explains that, the basic objectives of Rasayana are,

1) Vayasthapana - preventing the aging of body tissues
2) Ayukara - provide longevity
3) Medhakara-m promotion of intelligence, learning and memory
4) Balakara - provide strength
5) Rogapaharana - prevention and cure of diseases by diseases by promoting body immune system.

These objectives are fulfilled by the following actions of Rasayana,

1) Agni sandhookshana- promoting digestion and metabolism
2) Doshasamyakaram- achieving, homeostasis of Doshas
3) Dhatuvardhana- improving Dhatuposhana
4) Srotoprakritisthapana- promoting competence of Srotas
5) Manaprasannata- promoting mental endurance.

Agni Sandhookshana - Agni has been given pivotal role in the delicate balance between health and diseases. According to charaka 'Agni' is responsible for life, the body tissue, strength and complexion of a person.

Charaka further opines that Rasayana promotes digestion and metabolism. There by proper production of rasa (nutritional essence of food) and elimination of the toxic metabolites and pollutants is achieved which in turn promote Dhatu Poshana.

Doshasamyakaram - Provocation of Vata is the prime responsible factor for the process of physical and mental aging. Bhavaprakasha opines that the Rasa Shoshana is the resultant of provacated Vata which results in cellular senescence. Hence prime importance should be given to treat Vata. Aging also brings derangement in other Dosha like Kapha and Pitta. Charaka explained that Rasayana by its Achintya and Adbutaprabhava does the equilibrium of Vata, Pitta and Kapha. This becomes responsible to restore normal physical and mental activities.

Dhatuvardhana - Rasayana agents might enrich the nutritional quality of Poshaka Rasa as most of them physically contain high quality of nutrients in their bulk and when administered, they are added to the pool of nutrition present in the Poshaka Rasa and in turn help in improving in Dhatuposhana.

The improvement in Dhatus results in promotion of Ojus which is considered as the quite essence of all Dhatus of the body. It is this Ojus which is responsible for imparting Bala in an individual. Bala or resistance or Vyadhikshamatva is responsible for an individual to guard himself against diseases and infection

Srotoprakritisthapana - The Rasayana drugs promote the competence of Srotas leading to the better bio-availability of nutrients to the tissues and improve the tissue perfusion. This is another mode through which Rasayana agent may help in promotion of nutritional status.

Manaprasannata- As Manas are Panchabhoutika its nourishment depends on the food. Rasayana by its enrich nutritional quality and Achintyaprabhava it becomes responsible to maintain all the psychological functions under normal status.

Thus, Rasayana drugs by the virtue of their Rasa, Guna (physico- chemical property), Veerya (metabolic effect), Vipaka (bio-transformation) and Prabhava (inexplicable effect), promotes digestion, metabolism, maintains homeostasis of Dosha, enriches nourishment and promotes body and mental functions. Thus becomes efficient therapy in treating aging.

Classification and Types of Rasayana with examples

A comprehensive classification of Rasayana is available in Sushruta Samhita which was further improved by the commentator Dalhana.

Classification of Rasayana according to the

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classical description.

A) According to mode of administration
   i) Kutipraveshika Rasayana
   ii) Vatatapika Rasayana

B) According to objective
   i) Kamya Rasayana
      a) Pranakamya- promotes logevity
      b) Medhakamya- promotes the intelligence
      c) Shrikamya- promotes the complexion
   ii) Naimittika Rasayana- used to treat some occupational related disorders.
   iii) Ajasrika Rasayana- used on regular basis like milk, ghee etc.

C) Special Rasayana drugs and measures
   i) Medhya Rasayana
   ii) Achara Rasayana

D) According to the effect
   i) Samshodhan Rasayana
   ii) Samshamana Rasayana

E) According to use Sushruta explains the concept of Rasayana in 4 chapters in Chikitsa Sthana where he classifies them according to their utility.
   i. Sarvopaghata Shamaneeya
   ii. Medhayushya Kameeya
   iii. Swabhava Vyadhi Pratishedhaniya
   iv. Nivrutta Santapeeya

F) Rasayana based on drug, diet and life style.
   1. Aushdha Rasayana - Drug Based Rasayana.
   2. Ahara Rasayana - Dietary Rasayana.
   3. Achara Rasayana - Lifestyle Rasayana.

Kutipraveshika Rasayana

It is a type where Samshodhana karma is essential. After Samshodhan patient into a specially constructed therapy chamber called Trigarbhakuti. He has to follow specific code and conduct of life with strict diet control. It is said that if Kutipraveshika Rasayana is carried out as per the norms laid down it leads to complete bio-physical transformation of man.

Vatatapika Rasayana

It is indicated in those patients who do not have enough resources and who cannot afford intensive rejuvenate care. This therapy is used while leading normal life. Samshodhan karma is not essential in such cases.

Ajasrika Rasayana

It is used in the form of Satvika Ahara consisting of Ghrita, Ksheera etc. constant use of such nourishing diet produces nonspecific Rasayana Prabhava in the body.

Naimittika Rasayana

It is used in the management of specific disease are known as Naimittika Rasayana.

Some Rasayana agents possess Medhakara effect and hence they are specially known as Medhya Rasayana. Medhya means anything that is beneficial for Medha, which is responsible for Dhi (Intelligence), Dhruti (retention power) and Smruti (Memory).

Achara Rasayana means rejuvenating life style with social and personal conduct by which one can acquire the Rasayana effect. It includes improved personal behaviours, social behaviours and Satvika Ahara. Achara Rasayana is essentially a non-pharmacological approach to social and mental health care leading in turn to positive health and longevity.

There are certain Rasayana drugs which when used may induce Vamana, Virechana karma in the body and thus the body gets purified. The vitiated Doshas are expelled for the body. These are called Samshodhan Rasayana. Samshamana groups of drugs produce Rasayana effect in the body restoring Doshasamya are internal homeostasis and metabolic constancy.

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Urjaskara Rasayanas as per Age and Occupations / Activities

Age	Loss of features	Desirable Rasayana
First (0-10yrs)	Balyavastha(Childhood)	Swarna (Gold)
Second (11-20yrs)	Vruddhi (growth)	Bala (Sida cordifolia Linn)
Third (21-30yrs)	Chavi (luster)	Amalaki (Emblica officinalis Gaertn)
Fourth (31-40yrs)	Medha (intellect)	Shankapuspi (Convolvulus pluricaulis Choisy)
Fifth (41-50yrs)	Twak (Complexion)	Jyotismati (Celastrus paniculatus)
Sixth (51-60yrs)	Drusti (Vision)	Jyotismati (Celastrus paniculatus)
Seventh (61-70yrs)	Shukra (reproductive power)	Ashvagandha (Withania somnifera L)
Eighth (71-80yrs)	Vikram (Courage)	Bala (Sida cordifolia Linn)
Ninth (81-90yrs)	Buddhi (intelligence)	Brahmi (Herpestris moniera HBK)
Tenth (91-100yrs)	Karma Indriya (motor organs)	Bala (Sida cordifolia Linn)
Eleventh (101-110yrs)	Chetas/Manas(mind)	Rasayana may not be effective
Twelfth (111-120yrs)	Jivan (ceasation of life)	Rasayana may not be effective

Occupational disorders	Desirable Rasayana
Lung disorders/ respiratory system disorders	Agastya Haritaki, Pippali Rasayana, Chywanprasha
Digestive System disorders	Bilva (Aegele marmelos L)
Nervous Disorders, alzhemers disease, Parkinson's disease, dementia	Brahmi (herpestris moniera HBK), Medya Rasayana
Insomnia, Undernourished (Karshya)	Ksheerghrita, Ashwagandha
Diabetes	Shilajatu
Stress	Medhya Rasayana, Ashwagandha
Skin disorder	Chitraka Rasayana, Gandhaka Rasayana
Piles	Bhallataka Rasayana
Obesity	Triphala Rasayana, Shilajatu
Kshataksheena	Sarpiguda Rasayana

Antioxidant and Immunomodulatory Effects of Rasayana with Reference to Research Articles

In light of newer techniques of researches some of very well-known Rasayana medicines are explored. Ashwagandha is well known medicinal herb used as Rasayana. It has shown to reduce reduced levels of dopamine (DA), 3,4-dihydroxy-phenylacetic acid (DOPAC) and homovanillic acid (HVA); antioxidants: glutathione (GSH) and glutathione peroxidase (GPx); and lipid peroxidation marker (TBARS) and GPx and induced thiobarbituric acid reactive substance (TBARS) level, proving it potential drug in treating catecholamines, oxidative damage and physiological abnormalities. Root extract of Ashwagandha has also shown good effect in relieving pain disability caused in patients of osteoarthritis of knee. Also, extract of leaves of Amalaki (Emblica officinalis) is found to exert rapid protective effects against lipid peroxidation by scavenging of free radicals and reducing the risk of diabetic complications.

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Amalaki is told to be the best medicine as Vayasthapana. Triphala another abundantly used medicine for various purposes also possesses Rasayana effects. Triphala was found to alleviate the nephrotoxic effects of bromobenzene by increasing the activities of antioxidant enzymes and reducing the levels of lipid peroxidation and kidney functional markers. Triphala has also exhibited anti-inflammatory effects in animal model.

Another famous Rasayana medicine Bilva has also shown strong antitumor and antioxidant activities. Also, Bilva has shown to possess gastro-duodenal protective and anti- ulcerogenic properties through its antioxidant mechanism. Some of classical Ayurvedic formulations such as Laxmivilas Ras, Agnitundi Vati, Ajmodadi Churna, Tribhuvankirti Rasa and Sitopladi Churna, when tested for their antioxidant effect, they were found to possess efficient scavenger of superoxide radical and all medicines were found to possess scavenging activity and inhibitory concentration 50%(IC50). Many other formulations are also tested on various parameters and are found to possess antioxidant, immune booster properties.

Importance of Lifestyle Counselling with Its Methods

Lifestyle counselling is an essential aspect of promoting health and well-being. It involves providing individuals with guidance and support to make positive changes in their daily habits and behaviors. The importance of lifestyle counselling lies in its ability to prevent chronic diseases, improve overall health, and enhance the quality of life. Here are some key reasons why lifestyle counselling is important, along with some methods and strategies:

Importance of Lifestyle Counselling

1. **Disease Prevention:** Lifestyle counselling plays a crucial role in preventing lifestyle-related diseases such as heart disease, diabetes, obesity, and certain cancers. By addressing risk factors like poor diet, lack of physical activity, and smoking, individuals can reduce their likelihood of developing these conditions.
2. **Health Promotion:** It promotes overall health and well-being by encouraging positive habits. This includes maintaining a healthy weight, managing stress, getting adequate sleep, and staying mentally and emotionally balanced.
3. **Quality of Life:** Lifestyle counselling can lead to an improved quality of life by helping individuals manage chronic conditions, reduce pain and discomfort, and enhance their physical and mental functioning.
4. **Cost Savings:** Preventing chronic diseases through lifestyle counselling can lead to substantial cost savings in healthcare. It reduces the burden on healthcare systems and decreases the economic impact of chronic illnesses.

Lifestyle Counselling emphasizes on crucial aspects such as nutrition, fitness, behaviour and support to the individual, and it draws upon the clinical disciplines to support individuals make better lifestyle choices to prevent, manage and improve any chronic conditions. Lifestyle counselling empowers individuals to take control of their health, prevent chronic conditions, and enhance their physical, mental, and emotional wellness.

The ABCDs framework for lifestyle counselling in which clinicians

(A) assess a patient's readiness for change,
(B) identify potential barriers to change,
(C) encourage patients to commit to measurable goals, and
(D) help them demonstrate progress by selecting an appropriate self-monitoring strategy.

Assess (A)- The first step in conducting a conversation about lifestyle modification should be to assess the patient's perception of his or her current lifestyle as well as motivation to change. Understanding patients' perceptions allows clinicians to glean important information about health literacy and education, after which information can be provided. In addition, it allows the clinician to assess patients' motivation to

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change, an important principle of motivational interviewing. Motivational interviewing is a directive, client-centered counselling style for eliciting behaviour change by helping clients explore and resolve ambivalence. Motivational interviewing has been shown to be an effective intervention to promote lifestyle changes in adults. The motivational interviewing framework acknowledges that the patient is ultimately responsible for overcoming his or her ambivalence toward change and that direct persuasion is not effective.

Barriers (B)- The next step is to discuss potential barriers toward successful change. Despite initial high motivation for lifestyle change, ultimate goal attainment is typically much lower. This may reflect the well-established tendency to magnify immediate gratification and minimize more distant consequences. As such, helping patients problem solve around predictable challenges may help them achieve longer-term goals. Barriers to lifestyle change conflict with the patient's self-efficacy, and low self-efficacy is strongly correlated with perceived barriers. Using this premise in our ABCDs framework, we suggest that pre-emptively addressing potential barriers allows the patient to better prepare for successful lifestyle modification by maximizing self-efficacy. In addition, exploring the barriers to change helps develop the patient-physician relationship and allows for a better understanding of the patient's situation. Common barriers to consider include competing demands on time from work; family; perceived or real financial stress; and social situations focused on food. In addition, depression should be identified and treated as it can otherwise limit the energy needed to change.

Commit (C)- Next, the clinician should challenge the patient to commit to a specific, measurable, and attainable goal along with a plan designed to achieve that goal. Goals should focus on health behaviors rather than other health factors like blood pressure and cholesterol levels. In addition, goals should be set as specifically as possible. For example, rather than setting a goal to simply exercise more, consider a goal to run 1 mile per day or to walk 10/ 000 steps per day on most days of the week. Also, lifestyle goals should be attainable. A goal that is too difficult simply creates frustration, while one that is too easy may not be taken seriously. The patient should be involved in setting these goals, using their self-efficacy to determine what is attainable. Asking patients what it would take to overcome barriers can be a useful step. Goals should be proximal, 1 to 2 weeks, if possible, to aid in their attainability. We encourage a written contract to make the agreement more tangible and memorable. Most electronic medical records have secure email functions that make this feasible and part of the medical record.

Demonstrate (D)- Patients should be asked to demonstrate progress toward their goals. This reinforces self-monitoring and helps establish more frequent and consistent follow-up. Self-monitoring between visits is a critical tool for successful behaviour change. It increases patient awareness of health behaviours and helps to identify internal and external factors that influence goal attainment. Numerous weight loss studies have demonstrated greater weight loss among participants randomized to dietary self-monitoring compared with those who were not asked to self-monitor. Mobile applications may ultimately represent a major breakthrough as they ease the burden of self-monitoring and facilitate real-time feedback. These have been shown to positively correlate with successful short-term risk factor modification.

The ABCDs framework of lifestyle counselling provides an organized approach for busy clinicians who may have had little formal training in lifestyle counselling.

MCQ on Rasayana

1. What is the primary goal of Rasayana therapy in Ayurveda?
   a) Weight loss b) Mental clarity
   c) Rejuvenation and longevity
   d) Pain relief

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2. Which of the following is NOT a category of Rasayana in Ayurveda?
   a) Vatatapika Rasayana
   b) Kamatmaka Rasayana
   c) Achara Rasayana
   d) Aushadha Rasayana
3. Which type of Rasayana focuses on dietary and behavioral practices to promote rejuvenation?
   a) Achara Rasayana
   b) Vatatapika Rasayana
   c) Aushadha Rasayana
   d) Kamatmaka Rasayana
4. The Rasayana therapy aims to improve which aspect of an individual's life?
   a) Financial status b) Social status
   c) Physical health and mental well-being
   d) Spiritual enlightenment
5. Which of the following is an example of an Aushadha Rasayana in Ayurveda?
   a) Yoga and meditation
   b) Balanced diet and exercise
   c) Herbal preparations or medicines
   d) Positive thinking and stress management
6. What is the recommended time of day to consume Rasayana preparations for maximum benefit?
   a) Morning b) Afternoon
   c) Evening d) Any time of day
7. Rasayana therapies are primarily concerned with:
   a) Treating acute diseases
   b) Preventing diseases
   c) Treating chronic diseases
   d) Providing immediate relief from pain
8. Which Rasayana herb is considered an excellent adaptogen and stress-reliever in Ayurveda?
   a) Ashwagandha (Withania somnifera)
   b) Brahmi (Bacopa monnieri)
   c) Triphala (a combination of three fruits)
   d) Guggul (Commiphora wightii)
9. Rasayana therapy is often divided into how many main categories in Ayurveda?
   a) 2 b) 4
   c) 6 d) 8
10. Rasayana therapy is often recommended in Ayurveda for which age group?
    a) Children b) Adolescents
    c) Adults d) All age groups
11. Which type of Rasayana focuses on rejuvenating the body and mind through dietary and lifestyle practices?
    a) Achara Rasayana b) Aushadha Rasayana
    c) Charaka Rasayana d) Yoga Rasayana
12. Which Rasayana herb is often recommended for the elderly to support mental acuity and cognitive function?
    a) Ashwagandha (Withania somnifera)
    b) Guggul (Commiphora wightii)
    c) Brahmi (Bacopa monnieri)
    d) Shatavari (Asparagus racemosus)
13. The concept of "Jara Chikitsa" in Ayurveda specifically deals with:
    a) Pediatric healthcare
    b) Geriatric healthcare
    c) Women's health
    d) Mental health
14. Kuti Praveshika Rasayana often includes isolation in a quiet, clean, and controlled environment. This environment is referred to as a:
    a) Ashram b) Kutir
    c) Panchakarma center d) Hospital
15. Which of the following is an example of a Naimittika Rasayana often recommended during the rainy season to boost immunity and prevent infections?
    a) Triphala Rasayana b) Amalaki Rasayana
    c) Chyawanprash d) Guggul Rasayana

Answers

1. c) Rejuvenation and longevity
2. b) Kamatmaka Rasayana

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3. a) Achara Rasayana
4. c) Physical health and mental well-being
5. c) Herbal preparations or medicines
6. a) Morning
7. b) Preventing diseases
8. a) Ashwagandha (Withania somnifera)
9. b) 4
10. c) Adults
11. a) Achara Rasayana
12. c) Brahmi (Bacopa monnieri)
13. b) Geriatric healthcare
14. b) Kutir
15. a) Triphala Rasayana

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Syllabus

Etymology/derivation of the word 'Yoga'. Definitions of Yoga according to Patanjali Yogasutras, Bhagavad Gita and Charaka Samhita. Difference between Rajayoga, Hathayogaand Karmayoga. Yogabhyasa Pratibhandhakas and Yoga Siddhikarabhavas. Mitahara and Pathya-apathyas during Yogabhyasa. Concept of Panchakosha theory. Description of Ashtangas of Yoga - Yama, Niyama, Asana, Pranayama, Pratyahara, Dharana, Dhyana and Samadhi. Suryanamaskara. Description of Shatkarmas - Dhauti, Basti, Neti, Trataka, Nauli, and Kapalabhati. Bandha - procedure and benefits of Mulabandha, Jalandharabandha and Uddiyanabandha. Mudras - Shanmukhi mudra and Jnana mudra. Shatchakras and their importance in Yoga practice. Description of Ida-Pingala-Sushumna nadis and their importance in yoga practice. Concept of Moksha according to Charaka, Muktatmalakshana and Moksha Upayas. Importance of International Day of Yoga (IDY). Adverse effects of improper Yoga practices.

Learning objectives

1. Describe adverse effects of improper Yoga practices
2. Explain the etymology / derivation of the word 'Yoga'.
3. Define Yoga according to Patanjali Yogasutras, Bhagavad Gita and Charaka Samhita.
4. Distinguish between Rajayoga, Hathayoga and Karmayoga.
5. Explain Yogabhyasa Pratibhandhakas and Yoga Siddhikarabhavas.
6. Describe Mitahara and Pathya-apathyas during Yogabhyas
7. Explain Panchakosha theory.
8. List out the Ashtangas of Yoga.
9. Describe Yama and Niyama with meaning according to Yogasutras and Hathayogapradipika.
10. Define Asana and explain the importance of asana. Distinguish between asana and physical exercise.
11. Describe the procedure, benefits, indications, and contraindications of Standing Yoga Postures such as Ardhakatichakasana, Padahastasana, Ardhachakrasana, and Trikonasana.
12. Describe the procedure, benefits, indications and contraindications of Sitting Yoga postures such as Swasthikasana, Gomukhasana, Padmasana, Vajrasana, Bhadrasana, Shashankasana, Ushtrasana, Pashchimottanasana, Suptavajrasana, Ardhamatsyendrasana, and Siddhasana.
13. Describe the procedure, benefits, indications and contra indications of Supine Yoga postures such as Pavanamuktasana, Sarvangasana, Matsyasana, Halasana, Chakrasana, Shavasana and Setubandhasana.
14. Describe the procedure, benefits, indications, and contraindications of Prone Yoga postures such as Bhujangasana, Shalabhasana, Dhanurasana, and Makarasana.
15. Describe the procedure, benefits and contraindications of Suryanamaskara.
16. Define pranayama and explain its types, benefits, time of practice, and avara-pravara-madhyamalakshanas.

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17. Describe the procedure of Nadishudhi Pranayama, its benefits, and Nadishudhilakshana.
18. Enumerate the Kumbhakabhedas.
19. Describe the procedure and benefits of Suryabhedana, Ujjayi, Sheetali, Sitkari, Bhastrika, Bhramari,Murcha, and Plavini.
20. Enlist Shatkarmas of Yoga, indications and their importance.
21. Describe the procedure, benefits, indications, contraindications, and precautions of Dhauti, Basti, Neti, Trataka, Nauli, and Kapalabhati.
22. Explain the term bandha & Describe the procedure and benefits of Mulabandha, Jalandharabandha, and Uddiyanabandha.
23. Describe Mudras and explain the benefits of Shanmukhi mudra and Jnana mudra
24. Describe Shatchakras and explain their importance in Yoga practice.
25. Describe Ida-pingala-sushumna nadis and their importance in yoga practice.
26. Define Pratyahara and explain its importance in Yoga practice.
27. Define Dharana and explain its importance in Yoga practice.
28. Define Dhyana and explain its importance in Yoga practice.
29. Describe Cyclic Meditation and Mindfulness meditation and their benefits.
30. Define Samadhi and explain its types and importance.
31. Define Moksha according to Charaka and explain Muktatmalakshana and Moksha Upayas.
32. Describe Global importance of International Day of Yoga (IDY)

Total - 28 hours (Lecture :22 hour, Non-lecture: 06 hours)
MCQ- Yes- SAQ (5 Marks)- Yes- LAQ (10 Marks)- Yes

Yoga is a science of right living and it works when integrated in our daily life. It works on all aspects of the person: the physical, mental, emotional, psychic and spiritual. Yoga is a 5000-year-old Indian philosophy that combines exercise, breathing, diet, relaxation and meditation. It is a combination of physical and mental disciplines which make the body stronger and healthier and the mind calmer and more controlled, helping towards self-realization. It emphasizes the relationship of body, mind and breath, the synchronization of the breath and movement, the use of preparation, counter pose, sequences of linked postures and modification of postures to suit individual needs.

Yoga is the art of living. Yoga is good for your posture and structural balance (leading to mental balance), it promotes flexibility and suppleness, strength and stamina, tones the internal organs, improves concentration, teaches you how to breathe more effectively facilitates relaxation and calms the mind.

Etymology/Derivation of the Word 'Yoga' Definitions of Yoga according to Patanjali Yogasutras, Bhagavad Gita and Charaka Samhita

The word Yoga is existent for more than five thousand years. However, even today, it may be the most popular Indian word in the world. The term Yoga is derived from the root 'Yuj' or 'Yujir' which means union (Yujir Yoge). The union denotes that individual soul (Jivatman) with cosmic soul (Paramatman). According to another derivation word Yoga means 'concentration' (Yuj Samadhi). In Bhagavad-Gita, the word Yoga is used to express a sense of divine power and glory. The word Yoga has rich collection of meaning both in ancient and contemporary science and literature.

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"Atha yoga-Anushashanam" another meaning of yoga is to become whole. Ultimately we only become whole when we are truly capable of helping others with the things that really matter; when we can help them understand how they came into this world, and what life is for, and whether it has to end with losing everything.

Definitions

योगश्चित्तवृत्तिनिरोधः । (प.यो.सू. 1/2)

Yoga- process of yoking; union
Citta - consciousness
Vrutti - patterning, turnings, movements
Nirodha - stilling, cessation, restriction

Patanjali in his Yogasutra defines Yoga as Cittavrutti is total of mental functions and Nirodha means cessation or control. Yoga can be simply defined as the process of gaining control over the mind.

युज्यते अनेन इति योग ।

Which unites is know as Yoga, which bring about union body and mind with god, atma with Paramatma, finitewith the infinite.

समत्वं योगमुच्यते । (भगवद गीता 2/48)

State of balance between failure and win or body and mind is Yoga.

मनःप्रशमनोपायः योगइत्याभिधीयते । (योगवसिष्ठ 3/9/32)

According to Yogavasistha, Yoga is considered as a technique to pacify thoughts of the mind.

सिद्ध्यसिद्धयोः समो भूत्वा समत्वं योगमुच्यते ।
(भगवद गीता 2/48)

State of equanimity in gain or loss. When mind is detached from the material world it could maintain a desire free state. Desire free mind will not be influenced with gain or loss, win or defeat and pleasure or misery.

योगः कर्मसु कौशलम । (भगवद गीता 2:48)

Yoga is skill in action. Those who perform action with this mental state will be able to diffuse the effect of his Sancita Karma (accumulated fruits of present birth) and Prarabdha Karma (carried over fruits of last birth). This state of mind will pave the way for evolving into the state of super consciousness. Yoga is a technique to perform action without being attached.

दुःख संयोगोः वियोगः योग इत्येव संज्ञितं ।
(भगवद गीता, 6:23)

According to this definition Yoga is disunion or negation of union of the self with sorrow. Shankaracharya also considers Yoga as disunion or negation of all kind of miseries and miss happenings with the self.

आत्मेन्द्रियमनोऽर्थानां सन्निकर्षात प्रवर्त्तते ।
सुखदुःखमनारम्भादात्मस्थे मनसि स्थिरे ॥
निवर्तते तदुभयं वशित्वं चोपजायते ।
सशरीरस्य योगज्ञास्तं योगमृषयो विदुः ॥
(च.शा. 1/138-139)

Charakacharya explains Yoga as a state where mind gets attached to soul. When soul, sense faculty, mind and sensual objects come in contact, communication between the internal and external environment establishes.

प्रमाणविपर्ययविकल्पनिद्रस्मृतयः । (प.यो.सू. 1/6)

There are five types of Cittavrutti- right knowledge (Pramana), illusion (Viparyaya), imagination (Vikalpa), sleep (Nidra) and memory (Smruti).

Pramana -

प्रत्यक्षानुमानानागमाः प्रमाणानि । (प.यो.सू. 1/7)

Right perception arises from direct observation, inference, or the words of others.

Viparyaya-

विपर्ययो मिथ्याज्ञानमतद्रूपप्रतिष्ठम । (प.यो.सू. 1/8)

Misperception is false knowledge, not based on what actually is.

Vikalpa-

शब्दज्ञानानुपाती वस्तुशून्यो विकल्प । (प.यो.सू. 1/9)

Conceptualization derives from linguistic knowledge, not contact with real things.

Nidra-

अभाव प्रत्ययालम्बना वृत्तिर्निद्रा । (प.यो.सू. 1/10)

Deep sleep is a pattern grounded in the perception that nothing exists.

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Smruti

अनुभूतिविषयसम्प्रमोषः स्मृतिः 1(प.यो.सू. 1/11)

Remembering is the retention of experiences.

अभ्यासवैराग्याभ्यां तन्निरोधः 1(प.यो.सू. 1/12)

The methods mentioned for attaining Cittavrutti Nirodha are practice (Abhyasa) and detachment (Vairagya).

Yoga has existed from Vedic times and its importance is described in several scriptures. In Upanishads such as Shvetashvataropanishad and Kathopanishad, yoga is referred as an essential means to achieve happiness. In Kathopanishad, for example, it is advised: "Treat the self as the person seated in the body as the chariot. Then, treat the intellect as the driver (charioteer), the mind as the reins and the senses as the horses. The one who has control of mind directed by intellect thereby controlling the senses leads the person to the spiritual goal. Otherwise a person's life will be as of a chariot driven by uncontrolled horses."

Bhagavad-Gita which is known as Yoga Shastra i.e. a scripture on Yoga, Lord Krishna emphasizes that the goal of everyone should be to achieve yoga, or state of equanimity. He beautifully describes the blissful state of a yogi (i.e. one that has achieved yoga). Then through Arjuna, He advises everyone to become a yogi. Lord Krishna says "Tasmat Yogi Bhava Arjuna".

Maharshi Patanjali has made great contributions in removing impurities in three domains namely though Ayurveda in body for good health, through commentary on Panini's grammar for good speech and through yoga for achieving pure mind. We are grateful to Maharishi Patanjali for systematically presenting a comprehensive process of yoga through Ashtanga yoga.

Histroy and development of Yoga

Historical evidences of the existence of Yoga were seen in the pre-Vedic period (2700 B.C.), and thereafter till Patanjali's period. The main sources, from which we get the information about Yoga practices and the related literature during this period, are available in Vedas (4), Upanishads (108), Smritis, teachings of Buddhism, Jainism, Panini, Epics (2), Puranas (18) etc.

Tentatively, the period between 500 BC - 800 A.D. is considered as the Classical period which is also considered as the most fertile and prominent period in the history and development of Yoga. During this period, commentaries of Vyasa on Yoga Sutras and Bhagawadgita etc. came into existence.This period can be mainly dedicated to two great religious teachers of India –Mahavir and Buddha. The concept of Five great vows – Pancha mahavrata- by Mahavir and Ashta Magga or eightfold path by Buddha - can be well considered as early nature of Yoga sadhana. We find its more explicit explanation in Bhagawadgita which has elaborately presented the concept of Gyan yoga, Bhakti yoga and Karma Yoga. These three types of yoga are still the highest example of human wisdom and and even to day people find peace by following the methods as shown in Gita. Patanjali's yoga sutra besides containing various aspects of yoga, is mainly identified with eight fold path of Yoga. The very important commentary on Yoga sutra by Vyasa was also written. During this very period the aspect of mind was given importance and it was clearly brought out through Yoga sadhana, Mind and body both can be brought under control to experience equanimity.The period between 800 A.D. - 1700 A.D. has been recognized as the Post Classical period wherein the teachings of great Acharyatrayas-Adi Shankracharya, Ramanujacharya, Madhavacharya-were prominent during this period. The teachings of Suradasa, Tulasidasa, Purandardasa, Mirabai were the great contributors during this period. The Natha Yogis of Hathayoga Tradition like Matsyendaranatha, Gorkshanatha, Cauranginatha, Swatmaram Suri, Gheranda, Shrinivasa Bhatt are some of the great personalities who popularized the Hatha Yoga practices during this period.

The period between 1700 - 1900 A.D. is considered as Modern period in which the great Yogacharyas- Ramana Maharshi, Ramakrishna Paramhansa, Paramhansa Yogananda, Vivekananda etc. have contributed for the development of Raja Yoga.This was the period

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when Vedanta, Bhakti yoga, Nathayoga or Hatha-yoga flourished. The Shadanga-yoga of Gorakshashatakam, Chaturanga-yoga of Hathayogapradipika, Saptanga-yoga of Gheranda Samhita, were the main tenents of Hatha-yoga.

Now in the contemporary times, everybody has conviction about yoga practices towards the preservation, maintenance and promotion of health. Yoga has spread all over the world by the teachings of great personalities like Swami Shivananda, Shri T.Krishnamacharya, Swami Kuvalayananda, Shri Yogendara, Swami Rama, Sri Aurobindo, Maharshi Mahesh Yogi, Acharya Rajanish, Pattabhijois, BKS. Iyengar, Swami Satyananda Sarasvati and the like.

Difference Between Rajayoga, Hathayoga and Karmayoga

There are different methods in Yoga to cater the needs of different members of the society. This is because each individual has a definite level in the birth cycle and evolution. One may be at primitive level and another may be about to reach the highest stage.

Rajayoga

राजयोग समाधिश्च उन्मनी च मनोन्मनी।
अमरत्वं लयस्तत्वं शून्याशून्यं परं पदम्॥
अमनस्क तथा द्वैतं निरालंबं निरंजनम।
जीवन्मुक्तिश्च सहजा तुर्या चेत्येकवाचका॥

(ह.यो.प्र. 4/3-4)

Rajayoga, Samadhi, Unmani, Manoumani, Amaratwa, Laya, Tatva, Shunya, Ashunya, Parama, Pada, Amanaska, Adwaitama, Niralamba, Nirajana, Jivana Mukti, Sahaja, Turya are all Synonymous.

Raja Yoga was the ultimate stage of yoga practice, one nearing Samadhi in historical context and in modern context; it refers to the Yoga school of philosophy in Hinduism. The term Rajayoga was introduced during the 15th century in Hathayoga Pradipika to distinguish the school bases on the Yogasutra of Patanjali from the more current school of Hathayoga. Raja Yoga is also referred to as the mental Yoga, or the Yoga of the Mind, because of its emphasis on awareness of one's state of mind. It is through this practice of concentration that one learns to calm the mind and bring it to one point of focus. It is at this point that we direct our attention inwardly, toward our true nature, which is Divine. You can achieve this by following the eight-fold path of Raja Yoga, which includes observation of the following:

1. Yamas (Abstentions) : Ahimsa (non-injury), Satya (truth), Asetya (non-stealing), Brahmacharya (chastity), Aparigraha (non-greed).
2. Niyamas (Moral Observations): Shucha (purity), Santosha (contentment), Tapas (austerity), Svadhyaya (study of the scriptures), Ishvara Pranidhana (surrender to God)
3. Asana: Steady pose, posture or seat
4. Pranayama: control of vital energy through breath work
5. Pratyahara: Withdrawal of the senses
6. Dharana: concentration of the mind
7. Dhyana: Meditation
8. Samadhi: Enlightenment, union with the Divine.

राजयोगं विना पृथ्वी राजयोगं विना निशा।
राजयोगं विना मुद्रा विचित्रापि न शोभते।

(ह.यो.प्र 3/119)

Without Rajayoga, this earth, the night and the Mudras, be they howsoever wonderful, do not appear beautiful.

Importance of Rajayoga

एकिभूतं तदा चित्तं राजयोगाभिधानकम।
सृष्टिसंहारकर्तासौ योगश्वरसमो भवेत॥

(ह.यो.प्र. 4/76)

अस्तु वा मास्तु वा मुक्तिरत्रैवाखंडितं सुखम।
लयोद्भवमिदं सौख्यं राजयोगदवाप्यते॥

(ह.यो.प्र. 4/77)

The union of the mind and the sound is called as Rajayoga. The Yogi becomes the creator and destroyer of the universe, like God. Perpetual

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happiness is achieved by this I do not care if the Mukti be not attained. This happiness, resulting from absorption is obtained by of Rajayoga.

राजयोगमजानंतः केवलं हठकर्मिणः ।
एतानभ्यासिनो मन्ये प्रयासफलवर्जितान ॥
(ह.यो.प. 4/78)

Those who are ignorant of the Rajayoga and practice only the Hatha Yoga, Maharishi opinion, that waste their energy fruitlessly.

Hatha Yoga

Hatha Yoga is a system of physical exercises and breathing control used in yoga. Science of Body purification and awakening of Pranic energy. Hathayoga is another important stream of Yoga suggested for common man. Hatha Yoga practices were closely was related to Tantra and other modes of worship. After the decline of Buddhism in India, Yogis like Matsyendra Nath, Gorakha Nath and few other Yogic components from the practice of Tantra, they picked up the useful, practical and noble practices of Yoga from the tantric system. A few texts written during 6th to 15th century

Goraksha Samhita-Yogi Gorakh Natha

Hatha Yoga Pradipika-Swami Swatmaram

Gheranda Samhita-Sage Gheranda

Goraksha Satakam-Guru Gorakshanath

Shiva Samhita-unknown author

Yoga Taravali-Sage Adi Shankaracharya

Hathayogaratnavali-Srinivas Bhatta Mahay-ogindra

Definition and objective of Hathayoga

हकारः कितितः सूर्यष्ठकारश्चन्द्रोच्यते ।
सूर्य चन्द्रमसोर्योगात हठयोगो निगद्यते ॥
हकारेण तु सूर्यस्यात स कारेणेनदरुच्यते ।
सूर्य चन्द्रसोरेक्यं हठ इत्याभिधीयते ॥
(योगशिखोपनिषद)

The word Hatha is a combination of two Bija Mantra 'ha' and 'tha'. 'Ha' means Pingala Nadi or sun principle. 'Tha' means Ida Nadi or moon principle. 'ha' represents mind, the mental energy and 'tha' represents Pranika, life force energy. Hathayoga means the union of the Pranika and mental forces. Usually Pranika and mental forces have tendency to remain imbalanced either Pranika force is predominant and mental force is subservient, or the mental force is predominant and Pranika force is subservient. The imbalance of Pranika and mental force may cause physical or mental unrest.

उदघाटयेत्कपाटं तु यथा कुंचिकया ह्यात ।
कुंदलिन्या तथा योगी मोक्षद्वार विभेदयेत ॥
(ह.यो.प्र. 3/98)

As a door is opened with key, so the Yogi opens the door of Muksha by opening Kundalini by means of Hatha Yoga.

Raja yoga and Hathayoga

हठं विना राजयोगो राजयोगं विना हठः ॥
न सिध्याति ततो युग्ममानिष्पत्तेः समभ्यसेत ॥
(ह.यो.प्र. 2/76)

No success in Raja Yoga without Hatha Yoga, and no success in Hatha Yoga without Raja Yoga. One should, therefore, practice both these well, till complete success is gained.

एकीभूतंतथाचित्तंराजयोगाभिधानकम ।
सृष्टिसंहारकर्तासौ योगीश्वरसमोभवेत ॥
(ह.यो.प्र. 4/77)

Yogi Swatmarama explains Raja Yoga as a synonym of Samadhi. When Citta becomes one with Atman, the state is called Raja yoga. The union of the mind and the sound is called as Rajayoga. The Yogi becomes the creator and destroyer of the universe, like, God.

विभ्राजते प्रोन्नतराजयोगमारोढुमिच्छोरधिरोहिणीव ।
(ह.यो.प्र. 1/1)

The Yogi then acquires the power of creating and destroying like god himself. Swami Swatmarama proclaims that the Hathayoga practice is to be considered as the staircase to reach Raja yoga. Those who do not aim at success in Raja yoga and are mere practitioners of Hathayoga, and their efforts will be fruitless. Swami Vivekananda

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named Patanjali Yogasutra as Raja yoga. The term Raja yoga is not mentioned as such in Yoga sutra.

Components of Hathayoga

आसनंकुम्भकंचित्रंमुद्राख्यंकरणंतथा ।
अथनादानुसन्धानमभ्यासानुक्रमोहठे ॥
(ह.यो.प्र. 1/58)

Swami Swatmarama mentions that Hathayoga has four components. Asanas, different types of Kumbhakas, practice called Mudras, Nadanusandhana is the sequence in practice of Hathayoga.

हठस्यप्रथमाङ्गत्वादासनंपूर्वमुच्यते । (ह.यो.प्र. 1/19)

Asana being the first component of Hatha, in Hathayoga, it is given priority.

Hatha Yoga Siddhi Lakshana

वपुः कृशत्वं वदने प्रसन्नता नादस्फुटत्वं नयने सुनिर्मले ।
अरोगता बिंदुजयोऽग्निदीपनं नाडीविशुद्धिर्हठयोग लक्षणम ॥
(ह.यो.प्र. 2/78)

When the body becomes lean, the face glows with delight, Anahata Nada manifests, and eyes are clear, body is healthy, Bindu under control and appetite increases, then one should know that the Nadis are purified success in Hatha Yoga Siddhi.

Mantra Yoga

Mantra is an invocation or a mystical formula, which aids the person to release the self and attain bliss and ultimate fulfillment. The sounds in a Mantra generate unusual mystic power. Mantra produces a set of vibration in the surrounding atmosphere & its force depends on the attitude of the person and the intensity of concentration. Mantras are performed with faith, the results cannot be analyzed measured, weighed, seen, but are felt.

The force of Mantra can be only felt. It should be performed with due faith and all rituals, and then it is fruitful. You must have complete faith in Mantra you are reciting and must know its meaning. Do the things as per prescribed methods. You will experience sensation and vibrations during or at the end of Japa, this is a sufficient proof to believe. Mantra requires faith, Japa, hard work and per laid dictums to realize the desired objects and vibrations. Each Mantra has a different use. The vibrations of sound create desired reactions within the body too.

Three ways to perform mantra-

Upanasu Japa : Only lip movement in there while chanting.

Manasika Japa : The Japa only in the heart without any sound or lip movements.

Vachanika Japa : Recite action in a low, medium or high tone.

Laya Yoga

Laya Yoga is an ancient form of meditation, with concentration on energy centers or chakras. Sage Gorakshnatha, an ancient sage of Nepal, and a disciple of Matsyendranath is the founder of Laya yoga. There are five main energy centers in the spine and two in the head. Laya yoga attempts to locate these energy centers and channelize them through meditation.

Laya essentially means to dissolve all Karmic patterns or conditioning and merge into the transcendental reality. It also means deep concentration and making an effort to obliterate the ego, thereby rising to a higher state of consciousness, called Turiya.

Laya Yoga involves techniques of meditation that cause the energy or Prana to move in certain ways, to awaken the Kundalini, the coiled up energy at the base of the spine. Laya yoga channelizes the energy forces in the Kundalini instead of merely controlling the mind. It is important that the Kundalini is activated through performance of Asanas, practice of Pranayama and making a conscious effort to guide this awakened energy in the spine and allowing it to immerse in the crown chakra.

The ultimate goal of Laya Yoga is to attain supreme consciousness through Pranayama (breathe control); it is a method to prevent fluctuations of the mind.

Jnana Yoga

Jnana Yoga is the knowledge of Brahman,

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Atman and the realization of their unity. It is one of the types of yoga mentioned in Hindu philosophies. It is also known as "Jnana Yoga". Jnana-yoga or the path of knowledge is the shortest but most difficult path for one to tread.

Jnana Yoga, the path of philosophy, is a systematic way of training the mind about the realities of life by contemplation. This will strip off the Avidya (ignorance) from our mind and the mind goes to its natural state of rest. Bhagavad Gita says that Jnana consists of properly understanding Kshetra (the field of the bodily activity) and Kshetrajna (the knower of the body that is the soul). Bhagavad Gita emphasizes that a person who went beyond the material world will understand the difference between these two.

Patanjali has mentioned about Videha and Prakritilaya. They are persons who have evolved to higher state of consciousness and who lost the life before attaining Moksha in the previous birth.

Sri Sankaryacarya is considered as an example for Prakritilaya. He accepted Samnyasa at the age of 6 year, completed his studies on all Vedas and Upnisads at the age of 12 year, brought out the commentaries on major Upanisad at the age of 16 and attained Moksha at an early age of 32 years. Just like him Jnanayogi believed to reach Moksha within a short span without undergoing the systemic practice of Raja yoga.

The Jnana Yoga is divided into three stages. First, hearing the truth that Atman is the only reality and that everything else is Maya. Second, reasoning upon this philosophy from all points of view. Third, giving up all further argumentation and realizing the truth.

This realization comes from certain basic concepts—

- The Brahman is real and everything else is unreal.
- Giving up all desire for enjoyment
- Controlling the senses and the mind
- Intense desire to be free

In Jnana Yoga, the first phase is Shravana (hearing). After the lecture hearing you must start cognizing about it, and then logically try to understand it, recapitulate that again and again, questioning it to the maximum possible extent, which is Manana. If necessary, discuss with the teacher and get logically convinced to start the experiment. Experiment is Nididhyasana.

Start dwelling on those truths which have been enunciated and logically accepted. This is Sadhana or deep meditation. This is also the deep contemplation of Jnana Yoga. As we go deeper and deeper into the meditation, we start unraveling higher and higher dimensions and we come to that conclusion that 'I am that Anandamayakosa' or bliss sheath. This is the core of Jnanayoga. In Gita it is told that from intensive meditation one acquires knowledge. The one who acquires knowledge also receives ultimate 'Shanthi'.

श्रद्धावाल लभते ज्ञानं तत्परः संयतेन्द्रियः।
ज्ञानं लब्धा परां शान्तिम अचिरेणाधिगच्छति॥
(4.39)

Which means: The man of Shradha, the devoted, who is the master of his senses, attains knowledge. Having attained this knowledge he goes promptly to the supreme peaceful state.

According to Swami Vivekananda, Jnana Yoga means "The realization of a man's own divinity through knowledge" (Swami Vivekananda. 2005, Vol. 5, p.292). The Vedas teach that the soul is infinite and is in no way affected by death. The Jnani has to come out of all forms, to get beyond all rules and books and be his own book.

Karma Yoga

Karma Yoga means that you can achieve a blissful state for yourself by engaging in acts of selfless service and keeping away from negative thoughts and actions.

Yoga means the merging of 'Jeevatma' in 'Paramatma'. For this Karma Yoga prescribes unselfish action. All actions are rewarded by results. Yet, an action becomes 'Niswartha Karma' only when it is done without desire for the fruits of action. All actions when carried out as on offering to God and with the adequate attention, become

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paths to Moksha. In the Bhagavad Gita it is thus mentioned about Karma Yoga – or the Yoga of action.

तस्माद असक्तः सततं कार्यं कर्म समाचर।
असक्तो ह्याचरन कर्म परम आप्नोति पूरुषः॥
(भगवद गीता. 3/19)

'Therefore, cons tartly perform your obligatory duty without attachment. By performing unattached action, man verily attains the supreme'. The results of the action are to be an offering to God. Here, it is required that a person sacrifices his personal ego. He should see God in the society around him. The concept of action, without any desire for its fruits, is the core of Karma Yoga. "The manner in which a man realizes his own divinity through works and duty" (Swami Vivekananda).

Bhakti Yoga

Bhakti Yoga is a spiritual path or spiritual practice within Hinduism focused on the cultivation of love and devotion towards God. It means to realize God.

Bhakti Yoga is the science of emotion. Indian culture gives several techniques to refine the emotions and this is contained in what is called Bhakti Yoga. Bhakti Yoga, the science of emotions, helps to train our emotional faculty, makes us mature, to have love for our nation and the society in tune with universal brotherhood. This path of emotions broadens our vision to overcome our pettiness, gross selfishness, hatred, greed, jealousy and raises us to the highest levels of universal brotherhood and oneness. Surrender is the core emotion of Bhakti Yoga. This has been indicated clearly in the Bhagavad Gita.

तेषाम अहं समुद्धर्ता मृत्युसंसारसागरात।
भवामि नचिरात पार्थं मय्य आवेशितचेतसाम॥
(गीता. 12.7)

It means: 'Fix your mind on 'ME' alone, let your thought dwell on 'ME'. You will hereafter live in 'ME' alone. Of this there is no doubt'.

"Bhakti is the science of higher love. Bhakti Yoga does not say, give up, it only says Love; Love the Highest" (Swami Vivekananda).Love is the natural impetus to union in the human heart. The object of Bhakti is God. Bhakti is greater than Karma, greater than Raja Yoga, because these are intended for an object in view. The Jnani's hold Bhakti to be an instrument of liberation, the Bhakta looks upon it both as the instrument and the thing to be achieved. The infinite love of God which enters one's heart leaves no place for any other love to live there. Love banishes all fear and grants supreme bliss.

Yoga Arambha Kala

वसन्ते वापि शरदि योगारम्भं समाचरेत।
तदा योगो भवेत सिद्धोविनायासेन कथ्यते॥
(घे.स. 5/15)

Yoga should be commenced either in Vasanta or Sarad. For in these seasons success is attained without much trouble.

Yogabhyasa Pratibhandhakas and Yoga Siddhikarabhavas. Mitahara and Pathya-Apathyas During Yogabhyasa

Yogabhyasa Pratibhandhaka

अत्याहारः प्रयासश्च प्रजल्पो नियमग्रहः।
जनसङ्गश्च लौल्यश्च षडभिर्योगो विनश्यति।
(ह.यो.प्र. 1/15)

In the process in Yoga one may face various obstacles. Every person has certain inhibitions due to Tamas and has certain over activeness due to Rajas. Overeating (Atyahara), Exertion (Prayasa), talkativeness (Prajalpo), excessive adhering to rules (Niyama Graha), being in the company of common people (Janasanga) and unsteadiness (Loulya) are the six causative factors which leads to obstruct Yoga.

Yoga Bhadhaka Tatva

व्याधिस्त्यानसंशयप्रमालस्याविरतिभ्रान्ति दर्शनालब्ध भूमिकत्वाऽनवस्थितत्वानि चित्तविक्षेपास्ते अन्तरायाः।
(यो.सू. 1/30)

- Vyadhi - Diseases
- Styana - Hindrance
- Samshaya - Doubt
- Pramada - Indifference

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- Alasya - Laziness or inertia
- Avirati - Sensuality
- Bhrantidarshana - Mistaken notion or illusion
- Alabdhabhomikatva - non-attainment
- Anavasthitatva - Instability.

Yogasiddhikara Bhavas as per Hathayoga

उत्साहवसाहसाधैर्यात तत्वज्ञानाच्च निश्चयात।
जनसङ्गपरित्यागात्षडभिर्योगः प्रसिद्धति॥
(ह.यो.प्र. 1/16)

- Utsaha - Enthusiasm
- Sahasa - courage
- Dhairya - willpower
- Tatvajnana - discrimination
- Nishcaya - determination
- Janasanga Parityaga - avoiding the company of common people are six causes that bring success in Yoga.

क्रियायुक्तस्य सिद्धिः स्यादक्रियस्य कथं भवेत।
न शास्त्रपाठमात्रेण योगसिद्धि प्रजायते।
(ह.यो.प्र. 1/67)

One who performs his deeds can get Siddhi, otherwise with only reading one not get the fruit of Siddhi of Asana, Pranayama and Mudra. Nishchaya means faith; devotion towards Shastra and Guru can lead to Yoga Siddhi. Associated people leads to desire, hatred, jealousy etc. so these when avoided assist Yoga Siddhi.

Mitahara and Pathyapathyani During Yogabhyasa

Mitahara (proper Diet)

सुस्निग्धमधुरश्चतुर्थांशविवर्जितः।
भुज्यते शिवप्रीत्यर्थे मिताहारः स उच्यते॥
(ह.यो.प्र. 1/60)

मिताहारं विना यस्तु योगारम्भं तु कारयेत।
नानारोगो भवेत्तस्य किञ्चिद्योगो न सिध्यति॥
(घे.सू. 5/16)

Proper diet is defined as Snigdha and Madhura food, leaving one fourth of the stomach free and eaten as offering to please Shiva. Shiva is the inner consciousness, the atman. Everything the Yogi should be considered as Prasada or offering to supreme beings.

Pathyahara

पुष्टं सुमधुरं स्निग्धं गव्यं धातुप्रपोषणम।
मनोभिलषितं योग्यं योगी भोहजमाचरेत॥
(ह.यो.प्र. 1/63)

शाल्यन्नं यवपिष्टं वा गोधूमपिष्टकं तथा।
मुद्गंमाषचणकादि शुभ्रं च तुषवर्जितम॥
(घे.सू. 5/17)

Yogi should eat food that is Pushtam, Madhura, and Snigdha, products of cow's milk and nourishing food of their own choice suitable for the practice Yoga.

गोधूमशलियवषष्टिकशोभनान्नं क्षीराज्यखण्डनवनीत-सितामधूनि। शुण्ठीपटोलक अलादिकपञ्चशाकं मुद्रादिदिव्य-मुदकं च यमीन्द्रपथ्यम॥ (ह.यो.प्र. 1/62)

पटोलं पनसं मानं कक्कोलं च शुकाशकम।
द्राढिकां कर्कटिं रम्भां डुम्बरीं कण्टकण्टकम॥
आमरम्भां भालरम्भां रम्भादण्डं च मूलकम।
वार्ताकीं मूलकं ऋद्धियोगी भक्षणमाचरेत॥
बालशाकं कालशाकं तथा पञ्चशाकं प्रशंसीयाव्दास्तूकं हिलमोचिकाम॥ (घे.स. 5/18-19)

The most conducive foods for Yogi are wheat, rice, barley, Shashtika rice, milk, ghee, sugar, butter, sugar candy, honey, dry ginger, Patola, the five leafy vegetables (Jivanti, Vastuka, Matsyaksi, Meghanada, Punarnava), Vastuka Shaka, Brinjal, green gram, and rain water are consider to be wholesome food for advanced Yoga.

Apathyahara

कटवम्लतीक्ष्णलवणोष्णहरितशाक सौवीरतैलतिलसर्षप-मद्यमत्स्यान। अजादिमांस दधितक्रकुलत्थकोलपिण्याकहिङ्गुल लशुनाद्यपथ्यमाहुः॥ भोजनमहितं विद्यात्पुनरौद्युषर्णकृतं रुक्षम। अतिलवणमम्लयुक्तं कदशनशाकोत्कटं वर्ज्यम। वन्हि स्त्रीपथिसेवव्रमहौ वर्जनमाचरेत। (ह.यो.प्र. 1/63-69)

योगारम्भे वर्जयेच्च पथस्त्रीवहिसेवनम।
नवनीतं घृतं क्षीरं गुडं शर्करादि चैक्षवम॥
पक्वरम्भां नारिकेलं दडिम्बमशिवासवम।
द्राक्षागलवनी धात्री रसमाल्मावर्जितम॥
(घे.स. 5/26-27)

The food those which are prohibited for Yogis are pungent, sour, penetrating, salty, hot, green leafy vegetables, sour gruel, oil, sesame, mustard,

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alcohol, fish, meat, curd, buttermilk, horse gram, fruit of Jujube, oil cakes, asafetida and garlic. Unhealthy diet should not be taken, that which is reheated after becoming cold, which is dry, which is excessively salty or acidic, stale or has too many vegetables, Rajasika and Tamasika Ahara and Stree Sahavasa Varja etc.

Concept of Panchakosha Theory

Pancha Kosha Yoga is a method of Yoga practice which was developed by Bethsabe. It is based on the ancient texts of the Indian philosophy Taittiriya Upanishad as well as inspirations of the teacher Selvarajan Yesudian.

Pancha : five
Kosha : body, cell, envelope
Yoga : union

Pancha Kosha Yoga is the union of the five bodies of which the human being is made up. Healthy living can be attained only if an individual is healthy in all spheres of his life. Leading a virtuous life leads to a healthy existence at physical, mental, intellectual and spiritual level. Eating right kind of food, breathing a pure Prana strengthens the Annamaya and Pranamaya Kosha. Engaging in contemplation and reflection strengthens the Manomaya and Vijnanamaya Kosha. Engaging in meditation and other spiritual activities strengthen the Anandamaya Kosha.

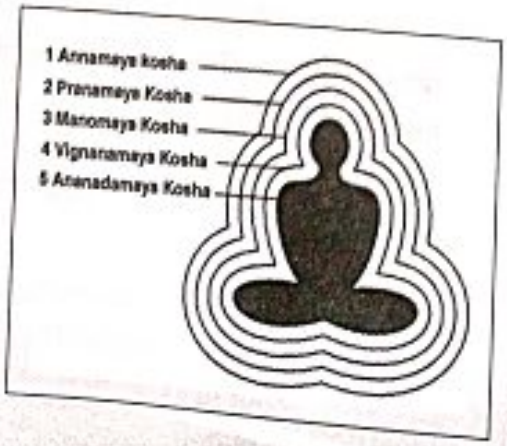
When all the five Koshas function in harmony it enriches the Ojas which results in nourishing the Tejas and Bala required for effective functioning of mind and body.

1. Annamaya Kosha or the Food Sheath
2. Pranamaya Kosha or the Energy Sheath
3. Manomaya Kosha or the Mental Sheath
4. Vijnanamaya Kosha or the Intellectual Sheath
5. Anandamaya Kosha or the Bliss Sheath

The following five bodies can be distinguished by Taittiriya Upanishad:

Sanskrit	Translation	Explanation	Activated by
Annamaya Kosha	Full of food	Physical body	Asanas & Kriya
Pranamaya Kosha	Full of energy	Energetic body	Pranayama's
Manomaya Kosha	Full of instinct & emotion	Psychic body	Relaxation with affirmations
Vijnanamaya Kosha	Full of knowledge	Consciousness body	Ethics and moral
Anandamaya Kosha	Full of bliss	Transcendental body	Meditation

All these Koshas are having different attributes and functions. The first layers is the gross body which is made up of food; the second is the vital force of human being; the third one is mental body which governs all the mental activities and emotions; the fourth one is the intellectual part of the body and the last one is the bliss, the essential true nature which is devoid of all afflictions.



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Annamaya Kosha

अन्नाद्वै प्रजाः प्रजायन्ते । याः काश्च पृथिवीश्रिताः । अथो अन्नेनैव जीवन्ति । अथैनदपि यन्त्यन्ततः ।

(तैत्तिरिय उपनिषद 2:2)

Anna means matter, Annam literally means food; Taittiriya Upanishad calls food the medicament of all. Annamaya Kosha is a representation of the gross physical body. This sheath is regarded as the medium of enjoyment for gross objects through the physical senses. According to this belief, all living beings in this world are born from food and remain alive by the consumption of food. In fact even after death, the body can be consumed as food by animals, insects or other beings. However, our physical health depends significantly on the foods that we eat and therefore, a diet that a person follows can be used to determine his or her nature. Food is also regarded as a medicine, as it can help improve a person's overall health.

Annamaya Kosha is made up of inert matter and it later goes back into mud again.

Pranamaya Kosha

तस्माद् वा एतस्मादन्नरससमयात ।
अन्योऽन्तर आत्मा प्राणामयः ।

(तैत्तिरिय उपनिषद 2:2)

Pranamaya Kosha is the second layer of our personality. The word Prana means source of energy. Every physical activity needs energy. Our vital functions which the Prana primarily governs are breathing, heart beats, circulation, and digestion etc.

Taittiriya Upanishad explains that this layer of our personality is almost like soul of the Annamaya Kosha. It because of this Prana that we live. Prana which according to its location, movement and purpose has been divided into five major and five minor components. Yogic literature mentions the presence of 72,000 pathways along which the Prana moves in human body. The moment Prana leaves the body; all activities come to an end.

Manomaya Kosha

तस्माद् वा एतस्मात प्रानमयात ।
अन्योऽन्तर आत्मा मनोमयः ॥ (तैत्तिरिय उपनिषद 2:3)

Taittiriya Upanishad states that the soul of Pranamaya Kosha is Manomaya Kosha. Manomaya Kosha is that layer of our personality which we call as mind (Citta). This sheath deals with the emotional, mental or perceptual part of the body, which comprises not just the mind, but also the organs within the body. The Manomaya Kosha influences the Prana Kosha and channels the ways we think. When Prana or life and Anna or food, operate together, Mana or the awareness does not really exist, because we do not think or feel anything else. The thoughts that originate within the body during the first sheaths can manifest themselves in the form of a disease that affects the body. All the diseases that involve the Manomaya Kosha can be treated by the Yoganga that have been prescribed through Ashtanga Yoga.

According to the Ayurveda and Yoga the seat of the most of the diseases is Manomaya Kosha. With the interaction of the world the mind is getting afflicted in many ways and the continued worries and stresses are percolating through the Annamaya Kosha or the Physical body gradually. This induces unwanted chemical changes in the body and it also affects the central nervous system in a wrong manner.

The Brahmari Pranayama, Nadanusanda practices, Meditations and hearing/ chanting devotional music are the remedial means in the Yoga to attune the Manomaya Kosha.

Vijnanamaya Kosha

तस्मद वा एतस्मान्मनोमयात ।
अन्योऽन्तर आत्मा विज्ञानमयः ॥

(तैत्तिरिय उपनिषद 2:4)

The Upanishad reveals that the self of Manimaya is Vijnanamaya. Vijnanamaya means composed of Vijnana, or intellect, the faculty which discriminates, determines or wills. It is the sheath composed of more intellection, associated with the organs of perception. This level is basically that of knowledge. Knowledge is our understanding and appreciation of the fundamental of life, real source of joy and happiness, the reality of things outside etc. we undertake a lot of analysis at this level and finally discriminate what is right and wrong.

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Vijnanamaya Kosha is dealing with the present i.e. here and now. Yogic counseling, study of scriptures, acquaintance with the vice and virtuous people are the means to strengthen Vijnanamaya Kosha.

Anandamaya Kosha

तस्माद वा एतस्माद्विज्ञानमयात ।
अन्योऽन्तर आत्मानन्दमयः ॥
(तैत्तिरिय उपनिषद 2:5)

Anandamaya Kosha is the soul of Vijnanamaya Kosha. This forms the last layer. Ananda refers to the bliss that a human can experience from any channel. Hence, the Anandamaya Kosha can be described as the transcendental body or the blissful body which in turn consists of the casual body of the Brahma. Since the self is the cause of all things, everything gets dissolved into it. Things are born, they grow and then they eventually die all because of Ananda. This shows that Ananda is the root of all human life. Hence, Ananda is the incarnation or a form of the Brahma. This bliss or Ananda comes from the Brahma. It is our ignorance that covers the bliss, just like how the skin covers the body. This is one of the Koshas that is not bound by either time or space.

In Yogic context deep meditation, state of Samadhi, doing virtual deeds are the means for the Anandamaya Kosha.

Health percepts of Pancha Kosha

Recently all medical systems acknowledged that more than 80% of the deceases of today, including diabetes (type II), cancer, peptic ulcer, arthritis, digestive disorders etc. are somatic diseases (Adhija Vyadis) or the diseases caused by the mind. By balancing and harmonizing the mind through various practices and techniques it is proven that Yoga can cure most of all ailments. In this connection the quotation, "For those wounded by civilization, yoga is the most healing salve" is worthwhile.

Yoga explains this phenomenon in such a way that, with the interaction of the worldly affairs the mind (Manomaya Kosha) is getting disturbed by the jealousy, hatred, worries, dissatisfaction, confusions etc. If this state of disturbance is continued for a long period the same percolates to the physical body in the form of diseases. Similarly, unfavorable physical conditions affect the mind adversely and in course of time in return it reflects in the body as a kind of aliment. From this fundamental theory on Koshas and diseases the importance of keeping all Koshas healthy and balanced is evident.

Since the body-mind relation or Annamaya Kohsa and Manomaya Kosha relation are very strong it has to be seen as the two sides of a coin, having no individual existence; the disturbance in one immediately affects the other. As the breathing (Pranamaya Kosha) is the bridge between the body and mind, the Pranamaya Kosha has also a vital role in this scenario. Again, since the intellect or Budhi (Vijnanamaya Kosha) governs the mind through the thought process, Vijnanamaya is also responsible for the diseases in a body. Finally, being Ananda or bliss original state, the Anandamaya Kosha also a part of total health of a human being.

Description of Ashtangas of Yoga-Yama, Niyama, Asana, Pranayama, Pratyahara, Dharana, Dhyana And Samadhi

यम नियमासन प्राणायाम प्रत्याहार धारणाध्यान समाधयोऽष्टावाङ्गानि ॥ (प.यो.सू. 2/29)

यमनियमासन प्राणायाम प्रत्याहार धारणा ध्यान समधयोष्टङ्गानि । (शाण्डिल्तोप 1/2)

Patanjali has propounded the comprehensive and multi-objective Anataranga and Bahiranga practices of Yoga through the classical Ashtanga Yoga in the form of Yama, Niyama, Asana, Pranayama, Pratyahara, Dharana, Dhyana and Samadhi.

Yama (Control)

तत्राहिंसासत्यास्तेय ब्रह्मचर्यापरिग्रहा यमाः ।
(प.यो.सू.2/30)

अहिंसा सत्यमस्तेयं ब्रह्मचर्य क्षमा धृति ।
ह्यार्जवां हिताहारः शौचं चैव यमा दशं ॥
(ह.यो.प्र. 1/17)

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Yama is the first step of Patanjali Ashtanga Yoga. Patanjali has described five Yamas.

The literal meaning of word Yama is control or abstinence.

1. Ahimsa - non-violence
2. Satya - Truth
3. Asteya - non-stealing
4. Brahmacarya - Abstinence
5. Aparigraha - non-hoarding

According to Hatha Yoga Pradipika described ten Yamas

1. Ahimsa - non-violence
2. Satya - Truth
3. Asteya - non-stealing
4. Brahmacarya - Abstinence
5. Kshama - forgiveness
6. Dhruti - endurance
7. Daya - compassion
8. Arjava - meekness or straight forward
9. Mitahara - moderation in diet
10. Shaucha - cleanliness

Ahimsa

अहिंसा प्रतिष्ठायां तत्सनिधौ वैरत्यागः । (प.यो.सू. 2/35)

अहिंसा सर्वथा सर्वदा सर्वभूतानां अनभिद्रोहं । (याज्ञवल्क्यसंहिता)

It means to avoid causing pain or hurting any living being mentally, verbally, or physically. The practice of ahimsa generates a broad based feeling of love and brotherhood which purifies the mental beings, the Citta. Avoiding the feeling of hatred to an individual is also a kind of ahimsa or non-violence. Mahatma Gandhi adopted only Satya and Ahimsa as foundation of his philosophy.

Satya

सत्यप्रतिष्ठायां क्रियाफलाश्रयत्वम ॥ (प.यो.सू. 2/36)

The literal meaning of Satya is truthfulness. One must be truthful in his speech, act and thought.

Asteya

अस्तेयप्रतिष्ठायां सर्वरत्नोपस्थानम । (प.यो.सू. 2/37)

मनसा वाचा कर्मणा परद्रव्येषु निस्पृहः ।
अस्तेयमिति संप्रोक्त ऋषिस्तत्वदर्शिभिः ॥ (याज्ञवल्क्यसंहिता)

It refers to the negation of the tendency of utilizing the wealth, belongings or thoughts of others in once own interest or benefits. This is essentially the practice of non-stealing in terms of money material or even thoughts and idea. The practice of Asteya not only brings about individual Citta Suddhi, but also reduces the amount of social tension and conflicts which may otherwise results due to stealing tendencies.

Brahmacarya

ब्रह्मचर्यप्रतिष्ठायां वीर्यलाभः । (प.यो.सू. 2/38)

कर्मण मनसा वाचा सर्वावस्थासु सर्वदा ।
सर्वत्र मैथुन त्यागो ब्रह्मचर्य प्रचक्षते । (गरुड पुरण 238/6)

Brahmacarya means not to deviate from one's own Svadharma or one's own original nature. It is not only abstinence from sexual pleasure although the same is an important aspect of Brahmacarya as it helps an aspirant to progress efficiently on the path of Yoga.

Aparigraha

अपरिग्रहस्थैर्य जन्मकथंता संबोधः । (प.यो.सू. 2/39)

The tendency of lustfully hoarding wealth and consumable materials in one's own selfish interest is called Parigraha and negation of this tendency is Aparigraha.

Niyama (Observance)

शौच संतोष तपः स्वाध्याययेश्वर प्रणिधानानि नियमाः । (प.यो.सू. 2/32)

तपः संतोष आस्तिक्यं दानमीश्वरपूजनम ।
सिद्धांतवाक्यश्रवणं ह्रिमती च तपो हुतम ॥
नियमा दश संप्रोक्ता योगशास्त्रविशारदैः ॥ (ह.यो.प्र. 1/18)

Niyama means observances. Under the heading Niyama, Patanjali suggests certain good habits, which help the development of total personality.

There are five Niyamas namely according to Patanjali

1. Shaucha - cleanliness

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2. Santosha - contentment
3. Tapas - penace
4. Swadhyaya - self study
5. Ishvarapranidhana - dedicating to God

According to Hatha Yoga Pradipika described ten Niyamas

1. Tapa - penance
2. Santosha - contentment
3. Astikya - belief in god
4. Dana - charity
5. Eshwarapoojana - worship of God
6. Sidhantavakyashravana - hearing discourse on the principles of religion
7. Hri - to be ashamed of doing undesirable acts
8. Mati - intellect
9. Japa - chanting mantras
10. Huta - scarifies the sensual experience for spiritual experience.

Shaucha (cleanliness)

शौचात्स्वाङ्गजुगुप्सा परैरसंसर्ग । (प.यो.सू. 2/40)

Shaucha refer to observance of cleanliness in physical, mental and social aspects of life. Cleanliness of the body, the clothing, the residences etc. is Bahya Shuddhi i.e. external cleanliness. Utilization of clean food and clean behavior with different individuals is also considered as Bahyashuddhi. On the other hand purification of the Antah-Karana by depleting emotions like Raga, Dvesha etc. with help of Japa, Tapa, clean thoughts and friendship etc. is considered Abhyantara Shaucha or internal cleanliness.

Hata Yoga described for Bahya Shaucha many process for cleaning body, brushing the teeth etc. and for Abhyantara Shaucha Dhouti, Basti, Neti, Trataka, Kapalabhati etc.

Santosha(contentment)

सन्तोषदनुत्तमः सुखलाभः । (यो.सू. 2/42)

Santosha is the second Niyama. Santosha means remaining contented with whatever facilities and circumstances, one is put to continuing the duties and remaining contented with whatever rewards comes forth. Contentment gives a superlative happiness.

Tapas (penance)

कार्येन्द्रियसिद्धिरसिद्धिक्षयात तपसः । (यो.सू. 2/43)

Penance produces purity of body and Indriya, Mana Shuddhi etc. Tapas is a practice of body and mind to perfect them. Constant practice of tapas enables Yogi to overcome the suffering caused by heat, cold, sun, rain, hunger and thirst. By destroying the impurity of internal organ and the body gets the powers to withstand the extreme situations.

Swadhyaya (study of scriptures or self study)

स्वाध्यायादिष्ट देवतासं प्रयोगः । (यो.सू. 2/44)

A regular time is to be devoted for the study of scriptures texts. Swadhyaya has stated that Japa is Swadhyaya. It includes both Swara and Mana. Japa has two types Vachika and Manasika. In Manasika Japa are also two types without Dhyana and with Dhyana. While doing Japa of particular Mantra, Omkara etc and reading spiritual texts are means salvation. Person can unite himself with desired God.

Ishvarapranidhana (dedicating to God)

समाधिसिद्धिरीश्वरप्रणिधानात । (यो.सू. 2/45)

Dedicating to Eshvara one can attain ultimate Samadhi. Dedicating to divinity or surrender to the God is an important methods to attain the highest state of existence i.e. Moksha or liberation. This path of yoga is called Bhakti yoga.

Asana

Asana is third part of Yoga, the synonyms for Asana is Mudra, Bhangima, Havabhava, Kayikaceshtha, Samsthiti, Sthiti etc. which includes different yogic postures, it helps to attain further steps of Yoga. Control over physical body leads to control over mind, which enhance all over development of being. The detailed description of Asanas is available only in the texts of Hatha-Yoga. The Asanas have definitely been mentioned in Upanisads but they have not been described in detail.

Amrutanadopanishad and Swetasvaropanisad just mention Asana.

सुखासनवृत्तिश्चिरवासश्चैवमासनं नियमो भवति ।
(मण्डल ब्रह्मनोपनिषद 1/1-5)

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Mandala Brahmanopanishada has considered asana as the posture for continued and comfortable sitting.

स्थिर सुखमानसनम् । (यो.सू. 2:46)

आसनेन रुजं हन्ति ॥ (योग.चूडा.उ. 109)

Asana is a posture in which an individual may stay stably and comfortably for a prolong period. Asana may vary from individual to individual based on the above mentioned principles.

हठस्य प्रथमांगत्वादासनं पूर्वमुच्यते ।
कुर्यात्तदासनं स्थैर्यमारोग्यं चांगलाघवम ॥

(ह.यो.प्र. 1/19)

Asana is the first step of Hathayoga, which produces Laghavata (lightness of the body), Sthairya (enhances strength) and Arogya (health).

Total number of Asanas

आसनानि समस्तानि यावन्तो जीवजन्तवः ।
चतुरशीतिलक्षाणि शिवेन कथितानि च ।

(घे.स. 2/1)

There are eighty-four lakhs of Asanas described by Shiva the postures are as many in number as there as number of species of living creatures in this universe.

तेषां मध्ये विशिष्टानि षोडशोनं शतं कृतम ।
तेषां मध्ये मर्त्यलोके द्वात्रिंशदासनं शुभम ॥

(घे.स. 2/1)

Among them eight-four are best and among these eighty four thirty two have been found useful for mankind in this word.

अथ आसनानां भेदाः ।
सिद्धं गुप्तं तथा मात्स्यं मुक्तं वर्जञ्च स्वस्तिकम ।
सिंहञ्च गोमुखं वीरं धनुरासनमेव च ॥
मृतं गुप्तं तथा मात्सर्यं मत्सेयन्द्रासनमेव च ।
गोरक्षं पश्चिमोत्तानं उत्कटं सङ्कटं तथा ॥
मयूरं कुक्कुटं कूर्म्मं तथाचोत्तान कूर्म्मकम ।
उत्तानमण्डुकं वृक्षं मण्डुकं गरुडं वृषम ॥
शलभं मकरं चोष्ट्रं भुजङ्गयोगासनम ।
द्वात्रिंशदासनानितु मर्त्तलोकेहि सिद्धिदम ॥

(घे.स. 2/3-6)

Total 32 Asanas explained by Gheranda Samhita.

Siddhasana	Padmasana	Bhadrasana
Muktama	Vajrama	Swastika
Simham	Gomukha	Vira
Dhanur	Mriamasana	Guptam
Matsyam	Matsendra	Goraksha
Paschimottasana	Utkatam	Sankatam
Mayuram	Kukkutam	Kurma
Uttana Manduka	Uttana Kurmakam	Vriksha
Manduka	Garuda	Vrisham
Salabha	Makara	Ushtram
Bhujangam	Yoga	

Upanisada	Number of Asana and Names
Yoga Cudamani	2 Siddhasana, Kamal
Yoga Kundala	2 Padamasana, Vajrasana
Amrutanda	3 Padamasana, Swastikasana, Bhadrakasana
Dhyana Bindu	4 Siddhasana, Padamasana, Simhasana, Bhadrasan
Yoga-Tattva sandilya	8 Svastikasana, Gomukhasana, Padamasana, Virasana, Simhasana, Bharadasana, Muktasana, Mayurasana.
Darshana	9 Svastikasana, Gomukhasana, Padamasan, Virasana, Simhasana, Bharadasana, Muktasana, Mayurasana, Sukhasana
Varaha	11 Charasana, Padamasana, Kuramasana, Mayurasan, Kukkutasana, Virasana, Svasthikasana, Bhadrasana, Simhasana, Muktasa, Gomukhasana.

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Classification of Asanas : Yogasana may be classified broadly into three types.

1. **Meditative Asanas** - These are the postures which are considered conducive to practice of meditation, breathing exercise and Pranayama practices. Dhyana if he is comfortably stabilized in meditative postures like Padmasana, Siddhasana, Bhadrasana, Swastikasana, Vajrasana etc.
2. **Relaxative Asanas** - Relaxative Asanas are for relaxing the psycholosomatic levels of the body.They should be performed before and after the Asana session or at any time when the body becomes tried. this Asana can be adoted during any time of the day for any comfortable duration, the relaxative Asana are Shavasana, Makrasana etc.
3. **Cultural Asanas** - Except relaxation and meditative Asana all a Asanas are considered as cultural Asana. The Asanas like Simhasana, Gomukhasana, Dhanurasana, Matsyendrasana, Mayurasana, Kurmasana, etc. practised for physical culture. The Asanas are described in great detail in texts of Hathayoga such as Gheranda Samhita, Shiva Samhita and Hathayoga Pradipika etc.

Asana and its importance

आसनसिद्धिउपाय-

प्रयत्नशैथिल्यानन्तसमापत्तिभ्याम । (यो.सू. 2/47)

Control on the body by Prayatna, Prayasa, Cheshta, cause Shaithilyata.

Difference between Yogasana and Vyayama –

No.	Yogasana	Vyayama (exercise)
1.	स्थिर सुखमानसनम् । (यो.सू. 2:46) Stable and comfort posture.	शरिरायस जनकं कर्म व्यायाम । Causing fatigue to the body.
2.	Mode of approach– Both internal and external i.e. body and mind.	Only external approach i.e. physical body development will be there.
3.	Mode of Performance Slow, steady and rhythmic	Vigorous movement, no maintenance periods
4.	Importance is not given for proceeding or receding period.	Importance is given for proceeding and to some extent receding time.
5.	Mainly the effect is felt on the trunk region of the body	Peripheral parts or extremities are well exercised.

Utility of Asana and their effect on the health

1. One can control his mind efficiently, only when he controls his body properly. This is brought about by Asana and thus helps in attaining the ultimate goal the salvation or Moksha.
2. By practicing Asana one can develop mental equilibrium, balance, endurance and great vitality.
3. Each Asana helping to stretch and stimulate specific group of muscles and finally make them relax deeply.
4. Asanas will help to reduce the Basal Metabolic Rate. Along with the reduction in Basal metabolic rate most of the vital organs gets relaxed.
5. Asanas are not just strengthening the muscles. But they also train the muscle to loosen and relax.
6. Asanas not only develop the body and soul, they prevent diseases, gave one relief from diseases. They invigorated the nerves, the lungs the muscles, the skin, and the various glands inside the body.
7. Many chronic diseases which could not be cured by drugs have been successfully cured by Asanas.

Utility of Asana can be taken as two folds.

1. Spiritually, it helps in controlling the mind and to attain Moksha.
2. Preservation of health (preventive) and cure the various diseases (curative).

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6.	All the movements are synchronized with breathing. A correct method of breathing is sought. Thus helps to relax ourselves	No attention is given for breathing instead it makes a person to breath rapidly, so does not give a sense of relaxation.
7.	Spine is stretched in all directions. It strengthens the spinal column and makes	It exerts strain on spinal column, usually leads to degenerative changes and injuries of spinal column.
8.	Complementary postures are included in order to give exercise all the directions.	No complementary movements' only single portion of the body is exercised in a single in direction.
9.	Includes relaxative posture in between practice like Shavasana, Makarasana.	Does not include such relaxative posture or exercise.
10.	Effect is felt on the both superficial as well as deep muscles like muscles of back.	Effect is more on superficial muscles.
11.	Does not aim at muscle building or body building.	Mainly aim at muscle and body building.

Hints and cautions for the practice of Asana

1. Without the practice of the principles of Yama and Niyama, which lay down firm foundations for building character, for that practice of Asana without the backing of Yama and Niyama is not possible.
2. The Asanas are to be practiced regularly without interruptions.
3. **Cleanliness and food-** Before starting to practice Asana, the bladder should be emptied and the bowel evacuated. If student is constipated or it is not possible to evacuate the bowels before practice of Asana start with Shirshasana and Sarvangasana and their variations. Attempt other asana only after evacuation.
4. **Bath-**Asana comes easier after taking bath. After doing them, the body feels sticky due to perspiration and it is desirable to bath some 15 minutes later. Taking a bath before and after practicing Asana refreshes the body and mind.
5. **Foods-**The best time to practice is either early in the morning or late in the evening.
6. **Sun-** Do not practices Asana after being out in the sun for several hours.
7. **Place-** They should be done clean airy place, free from insects and noise. Do not do them on a bare floor or uneven place but on folded blanket laid on a level floor.
8. **Caution-** No undue strain should be felt in the facial muscles, ears and eyes or in breathing during the practice.
9. **Closing of the eyes-** In the beginning, keep the eyes open. Then you will what you are doing and where you go wrong.
10. Mirror- If you are doing the Asana in front of mirror keep it perpendicular to the floor and let it come down to ground level.
11. The Brain- During the practice of Asana, it is the body alone which should be active while the brain should remain passive, watchful and alert.
12. Breathing- In all Asana, the breathing should be done through the nostril only and not through the mouth. Do not restrain the breath while in the process of the Asana.
13. Shavasana- after completing the practice of Asana always lie down in Shavasana for at least 10-15 minutes as this will remove fatigue.
14. Menstruation- Avoid Asana during the menstrual period but flow is in excess of normal Konasana, Baddhakonasana, Vajrasana, Janushirshasana, Pashimottasana, Uttanasana may be performed with beneficial effect.
15. Pregnancy- All Asana can be practiced during the first three months of pregnancy.
16. After Delivery- No Asana should be done during first month after delivery.

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17. Effects of Asanas- Faulty practice causes discomfort and uneasiness within a few days. This is sufficient to shows that one is going wrong.

Yogasana-Classification

1. Standing Postures
2. Sitting postures
3. Supine postures
4. Prone postures
5. Suryanamaskara

Standing Postures

Ardhakatichakrasana-(half Moon Pose)

Ardha means half, Kati means waist & Cakra is wheel. In this posture semicircle is formed at the waist by lateral bending.

Procedures

Sthiti - Tadasana

Step 1 - Slowly raise the right arm, till the arm or bicep muscle touches the ear with inhalation, palm facing sideways, stretch the arm to the maximum.

Step 2 - Slowly bend the body to the left at waist as far as possible with exhalation. Slide the left arm down as far as possible over the thigh. Allow the hand to hang freely. Final posture. Maintain the position for some time with normal breathing.

Step 3- Return to initial position with inhalation. Slowly straighten the body. Keep the spine erect.

Step 4 - bring the right hand slowly downwards until touches the right thigh.

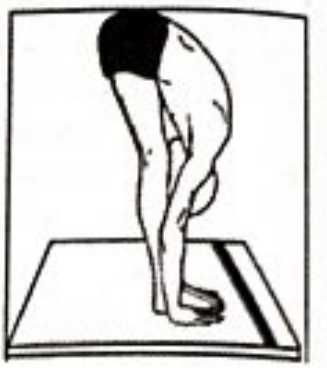
Relax in Sthiti-Tadasana

Repeat the same on the other side.

Effects and benefits

1. Enhances flexibility & digestive power.
2. Reduce stiffness of back, leg, reduce waist line.
3. Lateral thoracic muscles are trenched, lungs capacity increases and excess fat around the waist reduces.

Padahastasana (Standing Forward Bend Pose)



In Sanskrit language "Pada" stands for foot while "Hasta" stands for hands while Pada & Hasta together means hand to foot. In fact Padahastasana is a third and tenth posture in the sequence while practicing Surya Namaskar.

Procedures

Sthiti - Tadasana

Step 1- Slowly raise the hands sideways up to the shoulder level with (inhalation).

Step 2- Raise the hand up above the head with biceps touching the ears, palms facing forward with inhalation.

Step 3- Bend body forward till body comes with horizontal position, parallel to ground with exhale.

Step 4- Bend further to touch the knees with the forehead, till palms can rest on the ground exhale and normal breath, final posture.

Step 5- Come to back with horizontal position, parallel to ground with inhalation.

Step 6- Come back with raising the hand up above the head with biceps touching the ears, palm facing forward with inhalation.

Step 7- Slowly down the hand sideways on thighs with exhalation.

Relax in Sthiti - Tadasana

Effects and benefits

1. Padahastasana benefits you for strengthening abdominal organs.
2. It eliminates possibilities of bloating of abdomen (tones up all abdominal organs), constipation, indigestion and other gastric problems.
3. It builds spine more flexible, resilient and straight.

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4. It removes extra fat from abdomen region.

Contraindication

1. If one suffering from back problems like slip disc, sciatica, severe blood pressure practices this Asana then it increases disorder even more.
2. This Asana cannot be practiced without any consultancy of doctor or experts.

Ardhachakrasana

Ardha means half, Cakra means circle. This posture appears like a half circle.

This Asana flexes the body backwards from the waist region.

Procedure

Sthiti - Tadasana

Step 1-Stand erect, support the back at the waist by the palm and exhale.

Step 2-Bend backwards from lumbar region with inhalation, neck fully extended. Remain in this posture for some time then to erect posture.

Relax in Sthiti - Tadasana

Effects and benefits-

1. It is beneficial in lower back ache.
2. It stimulates blood circulation & spinal nerves.

Caution - Hypertension and vertigo patients should do this asana with care.

Trikonasana-Triangular Posture

In Sanskrit language "Trikona" stands for "three angles" or "triangle" and also while practicing this asana the body structure seems to be triangular shape that is why this asana is renowned as Triangle Pose. This asana is also famous by the name Utthita Trikonasana which means "Extended Triangle Pose".

Procedure

Sthiti - Tadasana

Step 1- Now keep your feet slightly further apart exactly equal to the distance between two shoulders.

Step 2 - Now inhale deeply and raise both arms in upward direction such that they parallel to the ground and palms facing in downward direction.

Step 3 - Exhale and turn torso to the left with a bend at waist such that right hand is in touch with the left ankle. Palm of right hand is kept along the outside of left ankle by extending left hand straightly upward.

Step 4 - Keep both hands and legs firmly straight and avoid bending at elbows and knees.

Step 5 - Turn head on left side upward direction and gaze at left hand fingertips.

Step 6 - Now inhale and get back to initial posture with both arms stretched out.

Step 7 - Retain this posture by holding breathe as long as one feels it comfort and ease.

Step 8 - Now exhale and repeat same 4 – 8 steps on other side

Relax in Sthiti - Tadasana

Time Duration for Trikonasana

It is suggested that one should practice triangle pose for 2-3 times on both sides as long as one can hold breathe during forward bending posture.

Contraindication-slip disc, sciatica

Effect and benefits

1. Trikonasana benefits you to stimulate blood flow in the body.
2. It stretch and provides relaxation to the shoulders, back, arms and legs.
3. It stretches thighs, calves & hamstring muscles and making them fit and strong.

Sitting Postures

Sitting postures are commonly used for meditation by the Yogis. These postures provide good stability to the body. It also help to attain effortlessly for a longer periods.

Swasthikasana - (Auspicious Pose)

Swasthikasana is an easy meditation pose for

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those who cannot attempt the more difficult Asanas like Padmasana, Siddhasana. Swasthikasana is one of the Dhyanatmaka Asana. The position of the legs resembles the symbol of the Swastika. Sanskrit root words- 'Su' meaning good, 'Asti' means to be or existence and 'Ka' means to make. This Asana can be prescribed as one that helps to realize the unity of existence.

जानूर्वोरंतरे सम्यक्कृत्वा पादतले ऊभे।
ऋजुकायः समासीनः स्वस्तिकं तत्प्रचक्षते॥
(ह.यो.प्र. 1/21, घे.स. 2/13)

Procedure

Sthiti - Dandasana

Step 1 - Spread both legs and keeps at a distance of 1 to 1.5 feet

Step 2 - Bend the left leg in knee joint and place its sole touching inner side of the right thigh.

Step 3 - Bend right leg at knee and place its foot in between the thigh and the calf of the leg.

Step 4 - Keep the wrists of the both hands on respective knee and take Dhyana Mudra, continue normal breathing for some time and then come to the earlier position.

Relax in Sthiti - Dandasana

Contraindication- suffering from sciatica and sacral infection.

Effect and benefits

1. Swasthikasana is good for Dhyana and Pranayama.
2. Increases the concentration.
3. Even those suffering from varicose veins and aching legs muscles can do it Swasthikasana.

Gomukhasana-(Cow Posture)

'Go' means cow 'Mukha' means face. Gomukhasana benefits those with diabetes, stiff back or shoulder, backaches and sexual aliments.

पादौ च भूमौ सम्स्थाप्य पृष्ठपार्श्वे नियेशयेत।
स्थिरकायं समासाद्य गोमुखं गोमुखाकृति॥
(घे.स. 2/16)

सव्ये दक्षिणगुल्फं तु पृष्ठपार्श्वे नियोजयेत।
दक्षिणोऽपि तथा सव्यं गोमुखं गोमुकाकृति॥
(ह.यो.प्र. 1/21)

Procedure

Sthiti- Dandasana

Step 1- fold the left knee back; place it next to right buttock.

Step 2- fold the right leg and place it on top of the left thigh.

Step 3- the knee of the both the legs should be close to each other, one above the other.

Step 4- bend your left arm and place it behind the back.

Step 5- bend your right arm, take it over the right shoulders and place it on the back as far as it can go.

Step 6- now try to touch the two hands behind the back. Initially you may be able to just touch the fingers. Later as you develop flexibility, you will be able to catch the left hand with the right hand.

Step 7- keep the trunk erect and expand your chest. Also pull the head a little to the back.

Step 8- maintain this position for as long as comfortable. In the final position, breathe normally and deeply, with awareness on the breathe.

Step 9- release the hands, straighten the legs and repeat the pose on opposite side for same time duration.

Relax in Sthiti-Dandasana

Effect and benefits

1. Beneficial in muscle cramps of legs.
2. It can remove stiff shoulder and back pain.
3. It helps in the treatment of sciatica.
4. It helps to develop the chest.
5. It stimulates the kidneys and can help suffering from diabetes.

Padmasana-Lotus Pose

Padmasana is an important meditative Asana and mentioned in most yogic texts. In Sanskrit,

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'Padma' means lotus and 'Asana' means pose. Padmasana is mentioned in yogic text Hathayoga Pradipika, as one of the main Asanas for meditation that can destroy all diseases. Ancient statues of Shiva, Buddha and Mahavira are all depicted as sitting in Padmasana. The hand Mudras may vary, but the legs are always shown seated in the lotus pose.

वामोरूपरि दक्षिणं हि चरणं संस्थाप्य वामं तथा दक्षोरुपरि पश्चिमेने विधिना कृत्वा कराभ्यां दृढम । अङ्गुष्ठौ हृदये निधाय चिबुकम् नासाग्रमालोकयेदेतव्व्याधिविनाशनाशनकरं पद्मासन प्रोच्यते ॥ (घे.स. 2/16 ह.यो.प्र. 1/46)

उत्तानौ चरणौ कृत्वा ऊरुसंस्थौ प्रयत्नतः ।
ऊरुमध्ये तथोत्तानौ पाणि कृत्वा ततो दृशो ॥
नासाग्रे विन्यसेद्राजदंतमूले तु जिव्हाया ।
उत्तंभ्य चिबुकं वक्षस्युत्थाप्य पवनं शनैः ॥
इदं पद्मासनं प्रोक्तं सर्वव्याधिविनाशन ।
दुर्लभं येने केनापि धीमता लभते भुवि ॥
कृत्वा संपुतितौ करौ दृढतरं बध्वा तु पद्मासनं ।
गाढं वक्शसि सन्निधाय चिबुकं ध्यायंश्च तच्चेतसि ।
वारं वारमपानमूर्ध्वमनिल प्रोत्सारयन्पूरित ।
न्यंचन्प्राणमुपैति बोधमतुलं शक्तिप्रभावान्नरः ॥
पद्मासने स्थितो योगी नाडीव्दारेन पूरितम ।
मारुतं धरयेद्यस्तु स मुक्तो नात्र संशयः ॥
(ह.यो.प्र. 1/47-51)

Procedure

Sthiti - Dandasana

Step 1 - bend the right leg at the knee joint, fold it upon itself and set the heal against the opposite hip joint, sole upturned.

Step 2 - left leg bend and holding the left foot with the hand place it over the right at the foot the heel being near the umbilicus.

Step 3 - sit in position comfortably with hands placed one above other, keeps the neck, hands and spine straight. Fingers in Jnana Mudra.

Step 4 - change the position of the legs after sometime performs the posture with opposite way.

Step 5 - relax with eyes closed and deep breathing.

Relax in Sthiti-Dandasana

Effect and benefits

1. Padmasana is one of the most important meditative Asana posture.
2. It is also recommended for the practice of Pranayama, it keep the mind attentive and alert.
3. Helps to arose Kundalini power.
4. Beneficial for increase the mobility of the ankle joint.
5. Since the blood is made to flow more towards pelvic region, coccygeal and sacral region, so that all nerves will gets toned up.
6. Enhance blood circulation in lumbar and abdominal region.
7. Removes the excessive fat around the hips and thighs.

Contraindication-avoids stages of acute osteoarthritis, sprains, inguinal hernia, and hydrocele.

Vajrasana-diamond Pose

Vajra means Diamond or thunderbolt. Normally Asanas should perform on an empty stomach but, Vajrasana is one of the few exceptions. This Asana can be done immediately after the meal. In fact it is more effective after the meal and aids in proper digestion. Tighten the thigh like the diamond and knees and the feet by the sides of anus, this is Vajrasana which gives Siddhi to Yogis.

जङ्घाभ्यां वज्रवत्कृत्वा गुदपार्श्वे पदावुभौ ।
वज्रासनं भवेदेतद्योगिनअं सिद्धिदायकम ॥
(घे.स. 2/12)

Procedure

Sthiti- Dandasana

Step 1-Sit erect with legs straight.

Step 2- Bend at the knee and place it by the sides of the thighs.

Step 3- Tighten the thigh and breath normally.

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Step 4- release the hands, straighten the legs for same time duration.

Relax in Sthiti-Dandasana

Effect and benefits

1. It increases the blood flow to lower pelvic region.
2. It helps to prevent acidity and ulcers by improving the digestion.
3. It is good meditative pose for those suffering from sciatica and severe lower back problems.
4. It helps in improving concentration.
5. This Asana strengthen the muscles in back, neck and chest regions.
6. It expands the chest and is good for lung problems.

Bhadrasana-Gracious or Blessed Position

गुल्फौ च वृषणस्याधो यत्क्रमेण समाहितः।
पादांगुष्ठौ कराभ्याञ्च धृत्वा च पृष्ठदेशतः॥
जालन्धरं समासाद्य नासाग्रमवलोकयेत।
भद्रासनं भवेदेतत्सर्वव्याधिनाशकम॥
(घे.स. 2/9, 10 ह.यो.प्र. 1/9)

Procedure

Sthiti- Dandasana

Step 1- fold the legs stretched forwards wide keep the right ankle below the right buttock besides the right part of genitals.

Step 2- place the left ankle in the same way both heals in contact, sole facing each other toes flexed and balanced.

Step 3- cross the hands towards the back and hold the toes of the feet.

Step 4- sit comfortable and stable.

Step 5- release the hands, straighten the legs.

Relax in Sthiti- Dandasana

Effect and benefits

1. Destroys all sorts of diseases.
2. Improves the mobility of joints
3. Meditative posture.
4. It awakens the Kundalini Shakti.
5. Strengthens the upper extremity.
6. Useful in genitourinary deformity.
7. Indicated in impotency.

Contraindications- piles, fistula in ano, joint pains etc.

Shashankasana (Hare Pose)

The Asana resembles a Hare in the final position. Benefits of Shashankasana include relaxation, relieving of depression and good upper body stretch. Shashankasana is an easy asana to perform and can be done by anyone regardless age.

Procedure

Sthiti - Dandasana

Step 1 - Sit in Vajrasana, place your hands on the thigh and breathe in a relaxed manner.

Step 2 - Raise both your hands above the head, palms facing forward. The arms should be in line with the shoulders.

Step 3- Slowly bend down and bring the hands forward, till the hands and forehead touched the ground. Exhales while you bending forward.

Step 4- In the final position the forehead and hands rest on the ground. Rest in this position for as you are comfortable. In final position slow rhythmic and relaxed breathings can be done.

Step 5- Exhale slowly and come back to the starting position.

Step 6- Repeat this process for 5 to 10 rounds.

Relax in Sthiti- Dandasana

Effect and benefits

1. This asana relaxes the mind and relieves.
2. It tones the pelvic muscle and relieves sciatica pain.
3. It can help in sexual disorders.
4. It gives a good relaxing stretch to upper body.

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Ushtrasana - (Camel Posture)

अध्यास्य शेते पद्युग्मव्यस्तं पृष्ठे निधायपि धृतं कराभ्याम ।
आकुञ्चयेत्सम्यगुदस्यगाढ मौष्ट्रञ्च पीठं योगिनो वदन्ति ॥
(घे.स. 2/41)

Procedure

Sthiti- Dandasana

Step 1- Kneel on the floor, keeping the thighs and feet together, toes pointing back and resting on the floor.

Step 2- Rest the palm on the hips, stretch the thighs, curve the supine back and extend the ribs.

Step 3- Exhale; place the right palm over right heel and left palm over the left heel. If possible place the palms on the soles of the feet.

Step 4- Press the feet with the palms throw the head back and push the spine towards the thighs, which should be kept perpendicular to the floor.

Step 5- Contract the buttocks

Benefits

1. This Asana applies a wonderful stretch to the whole chest and abdomen, at the same time imparting a thorough massage to the internal organs.
2. As a result, it is useful for alleviating various abdominal ailments associated with the kidneys, pancreas, intestines, liver, etc.
3. Shallow breathing is often caused by inflexibility of the rib cage. Ushtrasana expands the rib cage and the associated muscles are made suppler. As a result deeper breathing is facilitated.
4. The spine is given a wonderful backward bend, loosening up the vertebrae and stimulating the spinal nerves. The shoulders are pulled backwards while the chest is pushed forwards, helping to correct rounded shoulders and a stooping back.
5. The front of the neck is fully stretched, applying a good massage to the nerves and organs in this region. In particular, the all important thyroid gland is regulated. Those people who suffer from backache, neck ache or general stiffness in the spine will gain relief through regular practice of this Asana.

Pashchimottanasana-(Back Stretching Pose)

प्रसार्य पादौ भुवि दण्डरुपौ संन्यस्तभालं चितियुग्ममध्ये ।
यत्नेन पादौ कराभ्यां योगीन्द्रपीठं पश्चितोत्तानमाहुः ॥
(घे.स. 2/24)

प्रसार्य पादौ भुवि दंडरुपौ दोर्भ्यां पदाग्रद्वितयं गृहित्वा ।
जानुपरि न्यस्तललाटदेशो वसेदिदं पश्चिमतानमाहुः ॥
इति पश्चिमतानमासनाग्र्यं पवनं पश्चिमवाहिनं करोति ।
उद्यं जठरानलस्य कुर्यादुदरे कार्श्यमरोगतां च पुंसाम ॥
(ह.यो.प्र. 1/30-31)

This Asana has many other names. The most common are Ugrasana (fierce or powerful pose) and Paschimottanasana, which has the same meaning as Paschimottanasana.

There are many meanings associated with the name of this Asana. Literally, the word Paschima means 'the back', or 'posterior'; it also means 'the west'. The word Utthana means 'to stretch'. Therefore, the usual English name of this Asana is 'the back stretching pose'.

This Asana is widely mentioned in many ancient texts. The Hatha Yoga Pradipika says: "Knees straight and fore head on the knees, hands on toes in a sitting position. It directs vital energy into the back especially in the Sushumna; the digestive power is increased, the obesity reduced. Man becomes free of diseases and maintains the body in a healthy condition."

It is similarly described in such books as the Gheranda Samhita and the Shiva Samhita. Infect, the Shiva Samhita is more specific in praising this Asana.

Procedure

1. Sit on the floor with the legs stretched out in front of the body.
2. Place your hands on the knees, palms facing

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downwards. Relax the whole body, especially the back muscles.

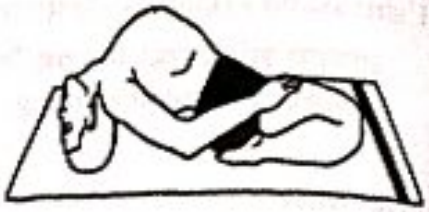
3. Breathe in deeply. Then, while exhaling, slowly bend your head and trunk forwards. As you move forwards, slide your hands along the legs towards the feet.
4. Don't bend your legs. Bend forwards as far as the flexibility of your back will allow.
5. Don't strain under any circumstances. The aim is to hold your big toes with the fingers and to touch your fore head to the knees; however many people, especially beginners, will find this impossible at present.
6. Merely bend forwards as far as you are able. If possible, grasp your big toes with your hands. If you cannot manage this, hold your feet at the heels. Otherwise grasp your ankles.
7. If this is impossible, hold your calves. Stay in this position. Consciously relax your back muscles again.

Benefits

1. The Asana stretches and tones the spinal and hamstring muscles and the associated nerves. Because it improves the efficiency of the spinal nerves in particular, it has beneficial repercussions throughout the entire body.
2. It loosens the hip joints. It helps to remove excess fat in the abdominal region.
3. The Asana tones all the abdominal organs, including the liver, pancreas, spleen, kidneys and adrenal glands.
4. As such it helps to remove diabetes, flatulence, constipation, etc.
5. It has been found useful for alleviating various types of sexual maladies, for the asana gives a direct massage of the pelvic region.
6. This is an Asana that is traditionally well known for its utility in harmonizing nervous and pranic energies within the body. As such it is very useful for helping to bring about states of meditation.

Suptavajrasana - (Sleeping Thunderbolt Pose)

The Sanskrit word Supta means 'sleeping' and Vajra is the name of a pranic channel (Nadi) connected with sexual energy. Vajra also means 'thunderbolt' the so-called weapon of Indra, the king of the gods in Hindu mythology. In this context, it is also associated with sexual energy. This asana is so called because it helps to transmute sexual energy into more subtle forms of energy.



Procedure

1. Sit in Vajrasana.
2. The knees can be together or separated lean slightly backwards.
3. Place the hands on the floor slightly behind and to the side of the buttocks.
4. Support the weight of the body on the straight arms.
5. Bend one of the arms, allowing the forearm and elbow to rest on the ground; to do this you will have to twist your body to one side.
6. Then slowly bend the other arm so that both elbows rest on the ground.
7. At this stage the trunk and head should be supported above the ground behind the buttocks.
8. Then take the final pose.

Benefits

1. Supta Vajrasana gives an excellent massage of the abdominal organs, there by helping to alleviate various types of digestive disorders.
2. The rib cage and lungs are given an accentuated stretch which helps to improve the breathing process by allowing the chest to expand to full capacity during respiration. It is therefore a good Asana for those people who suffer from asthma, bronchitis or any other lung ailments.
3. Supta Vajrasana loosens up the whole spine and removes any tendency towards round shoulders. The associated nerve connections and blood supply are rendered more efficient. The nerves in the neck and the thyroid gland are particularly influenced.

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4. The pelvic region is also given a good stretch; this Asana is therefore useful for ladies in preventing or removing various forms of sexual malfunctions.

Ardhamatsyendrasana - Half Spinal Twist

This Asana is named after the great Yogi Matsyendranath, who is reputed to have performed meditational practices in the full form of this Asana called Matsyendrasana. This is one of the most difficult Asanas in yoga, requiring a 'rubber body'. For this reason we will concern ourselves only with the easier half form of the asana at this stage.

The Sanskrit word Matsya means 'fish', which explains how Matsyendranath and the Asana which we will shortly discuss got their names.

Procedure

Stage 1: starting position

1. Sit on the floor with both legs stretched in front of the body.
2. Bend the right leg and place the right foot on the outside of the left knee.
3. Adjust the position of the right foot so that the sole is flat on the floor with the ankle in touch with the side of the left knee; the foot and toes should point forwards.
4. Place the left hand on the left side of the body; this will act as support for the next body adjustment.
5. While leaning on the left arm, fold the left leg backwards to the right.
6. Place the left heel so that it is in contact with the right buttock.
7. The legs should now be in the position as shown in the above figure.
8. Then slowly and gently twist the trunk to the right.
9. Place both hands on the floor on the right side of the body, making the arms straight.
10. Then try to grasp the right ankle with the left hand; don't strain.
11. The left arm should be adjusted so that it is straight and so that the back of the arm is in contact with the right knee and calf; the right knee should be as close as possible to the left armpit.

Benefits

1. It has been found useful for helping to treat all manner of ailments, including diabetes, indigestion, rheumatism and constipation.
2. Ardha Matsyendrasana has been found beneficial in the treatment of backache, neck ache and headache as well as general body stiffness.
3. It helps to remove any tendency towards round shoulders and has been found useful by many people who have mild cases of sciatica and slipped disc.
4. Contributes much to bringing the spinal muscles and nerves into optimum health.

Siddhasana- Male Accomplished Pose

The Sanskrit word Siddha has many meanings and implications. It means 'power' and 'perfection', so that this Asana can also be called the perfect pose or the powerful pose. The word Siddhi is derived from Siddha and means a psychic power or faculty developed through Yogic practices. This includes clairvoyance, telepathy as well as many other lesser known powers such as the ability to disappear at will.

Siddhasana is believed to be the Asana that helps to develop these powers.

It is an excellent meditative Asana and the equal of Padmasana. It is often used in specific practices for it applies pressure in the region between the anus and the sexual organs (Mooladhara Chakra). Siddhasana can only be practised by men. The female equivalent is called Siddha Yoni Asana.

योनिस्थानकमडघ्रिमूलघटितं संपीडा गुल्फेतरं। मेढ्रोपर्यथ सन्निधाय चिबुकं कृत्वा हृदि स्थापितम। स्थाणुः

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संयमितेन्द्रियोऽचलदृशा पश्यन भ्रु वोरन्तर मेवमोक्षविधायते फलकरं सिद्धासनं प्रोच्यते ॥ (ह.यो.प्र. 1/37, घे.स. 2/7)

Procedure

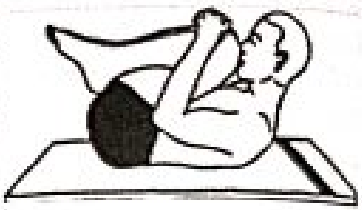
1. Sit with the legs stretched in front of the body.
2. Fold your right leg and place the sole of the right foot against the inside of the left thigh.
3. Your right heel should be placed so that it presses against the area between the anus and the genitals (the perineum). This is an important aspect of Siddhasana.
4. Adjust your body until you are comfortable and the heel is firmly applied against the perineum.
5. Then fold your left leg and place the left foot on top of the right calf. If possible, try to adjust the position of the left heel so that it presses into the pelvis immediately above the genitals.
6. Your genitals should therefore lie between the two heels. If you find this last position difficult, do not worry; merely place your left heel as near as possible to the required position.
7. Adjust the position of the left toes so that they can be pushed into the space between your right calf and thigh.
8. The left toes should fit into this space without any pain or general discomfort.
9. If necessary, this space can be enlarged slightly by using the hands or temporarily adjusting the position of the right leg.
10. Then grasp your right toes, either from below or above your left leg and pull them upwards into the space between your left thigh and calf. Adjust the body so that it is comfortable.
11. The knees should be in contact with the ground. The heels should preferably be one above the other. Hold the spine and head upright, yet relaxed.

Benefits

Siddhasana gives essentially the same benefits as Padmasana. It differs, however, from Padmasana in that one of the heels applies pressure in the region of the perineum. This pressure is necessary in various yogic practices such as Moolabandha and Vajroli Mudra. These are used a great deal in Kriya Yoga techniques together with Siddhasana. This pressure is important, for it is concerned with awakening a psychic centre in this area called the Mooladhara chakra.

Supine Postures

Pavanamuktasana



The Sanskrit word Pavan means 'wind' and the word Mukta means 'release' or 'free'. Hence this is a wind releasing pose because it is very useful in removing wind or flatulence from the intestines and stomach. It is especially useful for beginners for though simple, it gives many benefits. Even the unhealthiest person can do this Asana.

Procedure

Stage 1 -

1. Place a blanket on the floor. Lie flat on your back. Relax the whole body.
2. Bend the right leg and bring the thigh and knee as near as possible to the chest.
3. The other leg should remain straight. Place the hands over the knee and interlock the fingers.
4. Gently pull the knee nearer the chest. Relax the whole body keeping the straight leg, back and head on the floor.
5. Breathe in deeply and slowly while simultaneously raising the head and shoulders.
6. At the end of inhalation the forehead, nose, chin or neck should touch or be as close as possible to the right knee.
7. Hold your breath for a short time in the raised pose. Then exhale slowly and lower the head and shoulders to the floor to resume the starting position. This is 1 round.
8. Inhale while again raising the body and repeating the procedure. Do a number of rounds.
9. Then straighten the bent leg and relax the whole body for a short time.

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Stage 2 -

Bend the other leg towards the chest and repeat the same procedure as given in stage 1.

Do the same number of rounds. On completion, straighten the left leg and relax the whole body.

Stage 3-

Now fold both legs to the chest. Repeat the same procedure as stage 1. Afterwards relax the whole body with awareness on breath.

Benefits

1. This Asana gives an excellent massage to the abdomen. In this pose the abdominal muscles are tensed and simultaneously the internal organs are compressed by the folded legs.
2. This increases the circulation of the blood and stimulates the nerves which connect the organs to the brain or nerve complexes. As such it helps in no small way to relieve various types of abdominal ailments associated with malfunctioning of inefficient organs.
3. This Asana is particularly useful for removing constipation and flatulence. Food moves from the stomach through the intestines during digestion.
4. This Asana also tones up the back muscles and spinal nerves.

Sarvangasana-Shoulder Stand Pose

The Sanskrit word Sarvangasana is made up of three separate words Sarva, Anga and Asana. The word Sarva Means 'whole', 'all' or 'entire', the word Anga means 'limbs', 'parts', 'organs' or 'members'. Sarvangasana is so called because it is an Asana which influences the whole body and its functions.

Procedure- Stage 1: raising the legs.

1. Place a folded blanket on the ground.
2. Lie flat on your back with both legs straight and together. Straighten your arms and place them beside the body, palms downwards.
3. For a few seconds completely relax the whole body.
4. During the next movement, raising the body, the breath can be retained inside or outside; that is, you can either breathe in deeply and raise the body or breathe out deeply. It does not matter, but you should hold the breath.
5. Slowly raise your legs by contracting and utilizing the abdominal muscles. The movement should be gradual and with control; it should take at least 10 seconds for the legs to reach the vertical.
6. Keep the legs straight and together. If possible try to raise the legs using only the abdominal muscles for this action will help to strengthen these muscles.
7. If this is impossible, however, you can help to raise your legs by pressing the arms against the ground.
8. At the end of the movement, the buttocks and back should be on the ground with the legs pointing directly upwards.
9. Remain in this position for a short time.

Benefits

1. The direct influence on the thyroid gland helps to remove many diseases and generally maintain good health of the entire body.
2. The ageing process is very much associated with the endocrinal system. One can help to maintain youthfulness and rejuvenate an ageing body by regular practice of Sarvangasana.
3. The thyroid gland controls the metabolism of the body. Therefore, by improving the efficiency of the thyroid gland through Sarvangasana one can maintain the correct body weight.
4. Sarvangasana helps to normalize the body weight by balancing the endocrinal system.
5. Sarvangasana integrates all the body systems, improving health and removing disease.
6. Sarvangasana improves the blood supply to the brain.
7. Sarvangasana on the parathyroid glands helps to ensure normal bone growth and regeneration and can prevent premature ossification (hardening) of the bones.

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8. Sarvangasana is very useful for asthmatics.
9. Sarvangasana is very useful for treating piles (haemorrhoids) and varicose veins, for it helps to drain accumulated blood from these areas.
10. Regular practice helps to remove various types of digestive ailments, especially where they are caused by blood congestion or general inefficiency of the organs. Diabetics are advised to practise Sarvangasana for it not only influences the pancreas, but also the entire endocrinal system.
11. Sarvangasana tones the reproductive organs and helps to prevent degeneration of the testes, gonads and ovaries as well as the other sexual organs, male and female. It has been found useful in helping to relieve menstrual, menopausal and other general sexual disorders. It helps to alleviate hydrocele, leucorrhea, spermatorrhea, etc.
12. Sarvangasana helps to eliminate and prevent various types of throat and nose ailments, including the common cold.

Matsyasana-Fish Pose

वामोरुमूलार्पितदक्षपादं जानोर्बहिर्वेष्टितवामपादम ।
प्रगह्य तिष्टेत्परिवर्तितागः श्रीमत्स्यनाथोदितमासनं स्यात ॥
मत्स्येंद्रं पीठं जठरप्रदिप्तिं प्रचंडरुग्मंडलखंडनास्त्रम ।
अभ्यासतः कुडलिनी प्रबोधं चंद्रस्थिरत्वं च ददति पुंसात ॥
(ह.यो.प्र. 1/28-29)

In Sanskrit the word Matsya means 'fish'. Therefore, this Asana can be translated as 'the fish pose'. At first this may seem a strange name for an Asana that seems to bear no resemblance what so ever to any kind of fish.

Procedure

Stage 1: starting position

1. Sit in Padmasana.
2. If you cannot sit in Padmasana please don't try to force your legs. Relax the whole body.

Stage 2: leaning backwards

1. Lean slightly backwards.
2. Place the hands on the floor slightly behind and to the side of the buttocks. Support the weight of the body on the straight arms.
3. Bend one of the arms, allowing the forearm and elbow to rest on the ground; to do this you will have to twist your body to one side.
4. Then slowly bend the other arm so that both elbows rest on the ground.
5. At this stage the trunk and head should be supported above the ground behind the buttocks. Then take the final pose.

Stage 3: final position - alternative A

1. Bend your head backwards so that you can see the floor behind your head.
2. Stretch the front of the neck as much as is comfortable.
3. Slowly slide your arms forwards away from your head and lower the top of the head towards the ground. Gently allow the top of the head to support the body weight.

Benefits

1. Matsyasana gives an excellent massage of the abdominal organs, thereby helping to alleviate various types of digestive disorders.
2. The ribcage and lungs are given an accentuated stretch which helps to improve the breathing process by allowing the chest to expand to full capacity during respiration. It is therefore a good Asana for those people who suffer from asthma, bronchitis or any other lung ailments.
3. Matsyasana loosens up the whole spine and removes any tendency towards round shoulders. The associated nerve connections and blood supply are rendered more efficient.
4. The nerves in the neck and the thyroid gland are particularly influenced.
5. The pelvic region is also given a good stretch; this Asana is therefore useful for ladies in preventing or removing various forms of sexual malfunctions.
6. The pressure of the legs on the thighs greatly reduces the blood circulation in the legs; the femoral arteries are compressed.
7. The blood flow is diverted to the pelvic organs

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including the sexual glands (testes and prostate in males and ovaries in females), which helps to revitalize these organs and eliminate various types of associated ailments.

8. It is also a useful Asana for loosening up the legs in preparation for sitting in still postures for meditational practice.

Halasana-Plough Pose

The Sanskrit word Hala means 'plough'. Halasana is so called because in its final pose it resembles a plough; not the modern mechanized plough but the wooden plough pulled by oxen or bulls that has been used in India since time immemorial and still is. The resemblance is very close. The English name for this Asana is, not surprisingly, 'the plough pose'.

The traditional method of doing Halasana is as follows:

Procedure

1. Lie flat on the floor, facing upward.
2. The legs should be straight and together and should remain so throughout the practice.
3. The palms can face upward or downward; beginners may place their fists under the buttocks with the knuckles facing upwards.
4. Relax the whole body and prepare for the practice. Breathe in deeply.
5. Then slowly raise the two legs to the vertical position; use the abdominal muscles as much as possible and the arms as little as possible.
6. The aim, eventually, is to use only the abdominal muscles to raise the legs without the slightest help of the arms; this may require a little time and practice.
7. Then fold the legs over the top of the head, keeping them straight as illustrated. As the legs are raised over the head, the buttocks and hips should also be simultaneously raised.
8. Gently lower the feet toward the ground behind the head, but without the slightest strain.
9. If possible touch the toes to the ground behind the head; those who are unable to do this should allow their feet to suspend above the floor.
10. This is the final pose.

Benefits

1. Halasana gives many of the same benefits as Sarvangasana. However, the direct influence on the brain is much less, with more emphasis on the back, abdomen and pelvis. It combines the benefits of inverted Asanas with forward bending Asanas.
2. Halasana is almost an upside down form of Paschimottanasana, though there is a distinctive difference between the benefits that they give. Paschimottanasana acts mainly on the lower back and stretch the back; Halasana, on the other hand, acts mainly on the upper back and neck region.
3. These two Asanas supplement each other. Halasana makes the entire spine supple, stretches the muscles, loosens the vertebrae and tones the nerves both inside and outside the spinal column. This leads to better efficiency of all the organs in the body.
4. The thyroid and parathyroid glands are rendered more efficient. The abdominal muscles are strengthened. The abdominal organs are massaged.
5. This helps to alleviate constipation, dyspepsia, diabetes and various other abdominal ailments. It generally decongests and revitalizes the liver, spleen, kidneys, pancreas and adrenal glands.
6. It helps to remove backache, neck ache and headache. Besides these physical benefits, Halasana done with attention can induce states of Pratyahara (sense withdrawal) as a preparation for meditational techniques.

Chakrasana-Wheel Pose

The word Chakra has many meanings 'wheel' 'circle', 'vortex', 'whirlpool', 'spiral' and so on. In the context of Chakrasana, the best English translation is 'wheel pose'. This Asana is so called because of the wheel shape taken by the body in the final pose.

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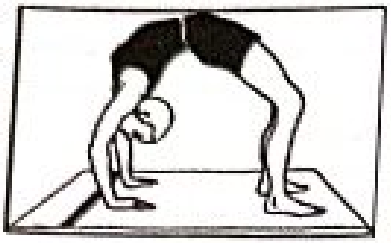
Procedure

1. Lie flat on your back. Bend the legs and place the heels near the buttocks; the feet should be about half a meter apart.

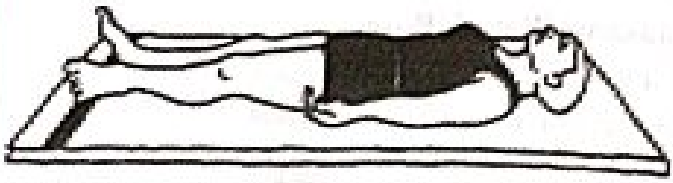


2. Bend the arms and place the hands on the ground beside the back of the head; the fingers should point towards the shoulders with the palms flat on the floor.
3. This is the starting position. Relax the whole body for a few seconds in preparation for performing the final pose.
4. Breathe in deeply.
5. Then raise the head and trunk off the ground by straightening the legs and arms; the feet and hands should not be moved.
6. Try to arch the back as much as possible to take the final pose. Let the head hang between the two straight arms.
7. The degree of bend in the back can be accentuated by bending or straightening the knees, and allowing the shoulders to move over the arms.
8. Do not try to bend the back more than its flexibility will allow.
9. This is the final pose. Breathe slowly and deeply. Stay in the final pose for as long as is comfortable.
10. Then slowly return to the starting position by slowly lowering the body to the ground.
11. The Asana can be repeated once or twice if you have sufficient energy and time.

Benefits

1. Chakrasana also massages the abdominal organs but by stretching the outer muscles, deep breathing in the final pose, accentuates this process.
2. Chakrasana, unlike Dhanurasana, is also an inverted Asana. Therefore, a minute or so in the final pose will flush the brain with a freshly oxygenated supply of blood. This will help to improve the efficiency of the brain cells and in turn, the overall health of the entire body.
3. Chakrasana is an excellent Asana that can help to bring about optimum health of the body

Shavasana



This Asana is also known as Mrutasana (the dead man's pose).

उत्तानं शववद्भूमौ शयनं तच्छवासनम।
शवासनं श्रांतिहरं चित्तविश्रांतिकारकम॥
(ह.यो.प्र. 1/34)

Procedure

1. Lie flat on your back in the supine position.
2. Place a small pillow or folded blanket behind your head with the corners pulled under the shoulders; this ensures that your neck and shoulder muscles can relax.
3. Don't use a thick pillow for this will tend to cause more tension by arching your neck upwards excessively.
4. Rest the arms in line with and on each side of the body.
5. Leave a little space between the arms and the side of the body.
6. The palms should face upwards and the hands should not be clenched.
7. The legs should be straight and slightly separated.
8. Close your eyes.
9. Try to feel the different parts of your body in contact with the floor. This is most important for it starts to develop your awareness of the different parts of the body.
10. Feel the contact between the floor and the buttocks. If you feel that the muscles of the buttocks are pulled together, release them.
11. Keep your attention on the pressure between the floor and the buttocks for a few seconds

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until you think that this area of the body is relaxed.

12. Now try to feel the contact between the ground and the right heel for a few seconds.
13. Repeat the same thing with the left heel.
14. Now- feel the contact between the floor and the right arm, right hand, left arm, left hand, middle of the back, each shoulder blade, the back of the head and finally the whole body; spend a few seconds at each point of contact.
15. Next, try to feel that your whole right leg is very heavy and that it is sinking into the floor. If you cannot feel this heaviness, don't worry a little practice is necessary in the beginning.

Benefits

1. Basically Shavasana relaxes the whole physiological, psychological system. A relaxed mind allows you to see and relate to the world and the people around you in a more realistic light, carry out your work more smoothly and attain more happiness in life.
2. A tense mind automatically implies a tense body. From this combination result the majority of diseases which inflict mankind.

3. Shavasana, by relaxing the mind-body complex, helps to relieve and prevent disease. Its benefits are inestimable.

Setubandhasana

In Sanskrit 'Bridge' means 'Setu', 'Bandha' means 'Lock' and 'Asana' means 'Pose'. The poses look like the shape of the bridge, so this pose is called as bridge poses i.e. Setubandhasana. Basically this pose is effective in relaxing the body and reducing stress. It stretches the chest, spinal cord and neck.

Procedure-

1. First lie down as Shavasana or in supine position.
2. Your arms should be on the sides of your thighs.
3. Now, fold your knees and clasp your ankle with your palms.
4. The distance between the feet should be 10 inches.
5. With inhale raise your back in relaxed manner as possible as you can.
6. One can also be on toes by raising the heels. It gives more stretching to the back as well as the neck.
7. Maintain the pose for 30 seconds or more with slow inhaling and exhaling.
8. Bring your back down with deep exhale and have a rest.
9. Repeat this process for 3 to 5 times.

Benefits

1. Thyroid treatment: Providing appropriate stretch on the back leads to suitable massage to the neck. In fact, it helps to regulate the functions of thyroid gland thereby helpful in releasing thyroxin hormone.
2. Relieves back pain: This asana provides the spine a backward movement and correct stretching, which is helpful in easing back ache and strengthens the back.
3. Good for neck pain: The yoga pose removes strain from the neck.
4. Good for tennis elbow: If one raises one's back by holding his ankle, it exerts effective stretch on the elbow and may be helpful in treatment of tennis elbow.
5. Good for mind and body: The yoga posture provides good health to nerves, which indirectly control the smooth coordination of body and mind.
6. Massage the Colon: It facilitates suitable stretches and massages to the abdominal organs, especially the colon.
7. Good for brain: It has calming effect to the brain thus helpful in reducing stress, depression and anxiety.
8. Enhance digestion: It improves digestion.
9. Osteoporosis: It is also suggested to those who have having the problems of Osteoporosis.
10. Good for asthma: It enlarges the horizon of

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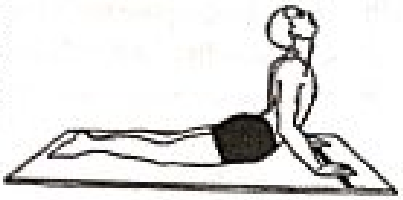
chest and shoulder while performing. Accordingly, works upon the expansion of the lungs.

11. Menopause problems: It helps to ease out the problems related with menopause.

Prone Postures

Bhujangasana-Cobra Pose

Bhujangasana emulates the action of the cobra raising itself just prior to striking at its prey. We have already discussed Ardha Bhujangasana, which is the preparatory pose form astering Bhujangasana. If your back is stiff then you should do Ardhabhujangasana just before doing Bhujangasana. Otherwise Bhujangasana alone is sufficient.



अंगुष्टनाभिपर्वन्तमधोभूमौ विनिन्यसेत ।
करतलाभ्यां धरां धृत्वा ऊर्ध्वशीर्षः फणीव हि ।
देवाग्निवंद्यते नित्यं सर्वरोगबोनाशनम ।
जागर्ति भुजगी देवी भुजगासनसाधनात ॥

(घे.स. 2/42-43)

Procedure

1. Lie flat on the stomach with the legs straight and the soles of the feet uppermost.
2. Place the palms of the hands flat on the floor below and slightly to one side of the shoulders; the fingers should point forwards and the arms should be bent with the elbows facing backwards.
3. Rest the forehead on the ground.
4. Close the eyes. Relax the whole body, especially the lower back. This is the starting position. Breathe out slowly and deeply.
5. Then as you breathe in raise the body in the way we will describe.
6. Slowly bend your head backwards so that the chin eventually points forwards and the back of the neck is compressed. Feel the stretch of the front part of the neck.
7. Now the arms must be brought into play. Slowly raise the head and shoulders off the ground by progressively straightening the arms.
8. Feel the flexion of the back roll down the spine starting from the neck region and working towards the lower back; try to feel the flexion of each individual vertebra throughout the movement. Remember, it is the arms that execute the movement.
9. Keep the back and legs as relaxed as possible.
10. Try to keep the navel in contact with the ground; if the navel is raised too high then the bend tends to be at the knees and not the back.
11. Continue slowly to arch the back as far as flexibility will allow.
12. In this position the back of your head should point towards your feet. Your arms may or may not be straight it depends on the flexibility of your back.
13. You will feel a pleasantly painful sensation in the lower back; this is a good sign that you are doing the Asana correctly. Hold this final pose for as long as comfortable.
14. On exhalation return to the starting position.

Benefits

1. This Asana increases the flexibility of the back and massages the abdominal organs. It gives many other similar benefits. In particular it influences the kidneys and the adrenal glands. The kidneys purify our blood.
2. This helps give our mental and physical constitution more stability.
3. This Asana massages the organs of the abdomen and pelvis such as the stomach, pancreas, liver, gall bladder and sexual and eliminative organs. In particular we recommend it for treating female disorders such as leucorrhoea, dysmenorrhoea and amenorrhoea as it notably tones the ovaries and uterus.
4. Those people who suffer from a slipped disc or sciatica can also benefit from this Asana, but they should be careful.

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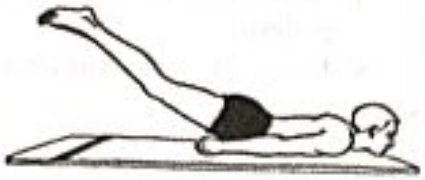
5. The thyroid gland is also regulated. This has a large part to play in maintaining a healthy body and its optimum condition is essential.
6. Bhujangasana expands the chest, which improves one's breathing habits.

Shalbhasana-Locust Pose



This Asana is so called because the legs are raised in the final position to imitate the tail of a locust. It is also commonly known as the grasshopper pose for the same reason. It is an excellent backward bending asana which has a specific influence on the organs, muscles and nerves of the pelvis, abdomen and chest. It is also particularly note worthy for the fact that it is one of the few Asanas that gives a direct massage to the heart.

अध्यास्यः शेते करयुग्मं वक्षेभूमिमवष्टभ्य करयोस्तलाभ्याम ।
पादौ च शून्ये च वितस्ति चोर्ध्वं वदन्ति पीठं शलभं मुनीन्द्राः ।
(घे.स. 2/39)

Procedure

1. Lie flat on the ground, face downwards.
2. Your legs should be straight with the feet together; the soles should point upwards. The arms can be placed either beside the body or under the body; the palms can face downwards, upwards or may be clenched.
3. The hands and arms is left to the discretion of the practitioner through his own personal experience.
4. Keep the chin in contact with the ground throughout the practice.
5. The shoulders should be as near as possible to the floor and remain so throughout the practice.
6. Relax the whole body. Close your eyes. Breathe out deeply.
7. Then inhale deeply, hold your breath and raise both legs, keeping them together and straight.
8. The elevation of the legs is produced by applying pressure on the arms and contracting the lower back muscles.
9. Hold the legs in the raised position while retaining your breath.
10. Hold the final position for as long as you can without straining.
11. Then slowly lower the legs and exhale.

Benefits

1. Shalabhasana stimulates the whole autonomic nervous system, particularly the parasympathetic outflow.
2. Shalabhasana does this by stretching the nerves and improving the blood circulation, allowing new oxygenated blood to circulate.
3. The pressure in the abdomen due to the weight of the body is transmitted to the lungs and heart via the diaphragm, improving the functioning of both these vital organs.
4. This Asana has been found useful for relieving sciatica and mild forms of slipped disc.

Dhanurasana-Bow Pose

The Sanskrit word Dhanu means 'a bow'. Therefore, this is called 'the bow pose', because in the final pose the body resembles a bow, the trunk and thighs representing the wooden part of the bow and the lower parts of the legs and the arms representing the bowstring.

प्रसार्य्य पादौ भुवि दण्डरुपौ करौ च पृष्ठे धृतपादयुग्मम ।
कृत्वाधनुस्तुल्यपरिवर्त्तिताङ्गं निगद्यं योगी धनुरासनं तत ॥
(घे.स. 2/18)

Procedure

1. Lie flat on the floor, facing downwards.
2. Bend the legs at the knees and bring the heels as close as possible to the back.
3. Reach back with your hands and grasp the ankles of each leg.
4. Hold the feet together so that the big toes are in contact.
5. Place your chin on the ground. Relax your whole body, especially your back. This is the starting position.

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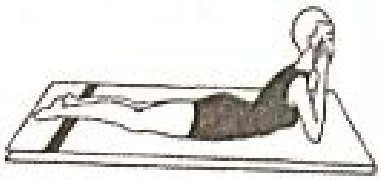
6. Breathe out deeply while on the ground. Breathe in deeply.
7. Then tense your leg muscles and try to straighten your legs.
8. This is of course impossible because of the anchoring effect of the arms.
9. The result will be that you will arch your back and lift thighs, chest and head off the ground. The only muscular contraction should be in the legs. The back, the arms and the rest of the body should be relaxed as much as possible.
10. Hold the head back and raise the chin.
11. You should adjust your position so that the soft part of the abdomen (the belly) supports the weight of the entire body on the ground.
12. Hold your breath in the final pose. Stay in the final pose for as long as it is comfortable.
13. Don't strain. Then slowly relax the leg muscles and return to the starting position.

Benefits

1. Dhanurasana roughly duplicates the benefits of Bhujangasana and Shalabhasana.
2. Improved functioning of the whole body, especially the digestive, eliminative and reproductive organs.
3. Overall improved digestion.
4. It helps to alleviate constipation, dyspepsia, sluggishness of the liver, diabetes and excess fat.
5. Relieves stiffness and the spine is made more supply and healthy.
6. This also helps to alleviate various types of rheumatism.

Makarasana-Crocodile Pose



This Asana is very similar to the sphinx Asana. It is an Asana that many people do naturally. Those who suffer from slipped discs or other spinal disorders, as well as asthma and other lung ailments.

अध्यास्यः शेते हृद्यं निधाय भूमौ च पादौ च प्रसार्यमाणौ ।
शिरश्च धृत्वा करदण्डयुग्मेदेहाग्निविकारं मकारासनं तत् ॥
(घे.सं. 2/40)

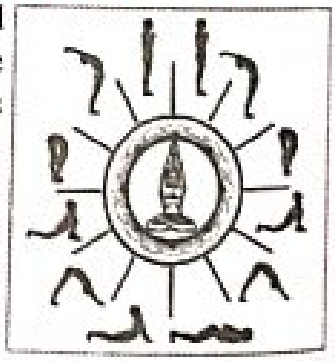
Procedure

1. Lie flat on the stomach with the head and shoulders raised off the ground.
2. The head is cupped in the palms with the elbows resting on the ground.
3. Relax the whole body and close the eyes.
4. Be aware of the natural and rhythmic breathing pattern.
5. If you like you can also count the breath.

Benefits

1. If you suffer from any spinal or lung ailments, we suggest you lie in Makarasana for as long as possible; the longer the better.
2. You can even read a book in this Asana. This position encourages the spine to resume its normal shape and releases compression of the spinal nerves (sciatica).
3. The chest is also expanded allowing an increased amount of air to enter the lungs, which is a great help in alleviating congestion and other ailments of the respiratory system.
4. This Asana can also be used as a simple meditational pose by those persons who find sitting Asanas impossible.

Suryanamaskara-Procedure and Benefits



The Sanskrit word Surya means 'sun' and the word Namaskara means 'salutation' or 'worship'. Therefore, this practice is known as 'salutation to the sun'. Surya Namaskara is a dynamic exercise. It is neither an Asana nor a part of traditional Yoga. But because it is such a wonderful practice we have incorporated it into the Yoga techniques that we teach.

It can be practised at almost any time of the day and in any place. No special preparations are necessary. If you feel tired during the day, a few rounds of Surya Namaskara will quickly restore the lost vitality, both physically and mentally. If you feel angry or depressed, Surya Namaskara is an excellent antidote; not a panacea, but a great

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help in removing emotional disturbances. It is a rhythmical, symmetrical exercise which is really a pleasure to perform. When it is perfected, the body almost appears to flow through the different movements without any effort or conscious will. Each part of the body seems to move automatically into the right position at the right time and in the right sequence without any effort.

Basic features

Surya Namaskara consists of live essential aspects. All of them must be done to gain the optimum results from the practice. These aspects are as follows:

1. Physical postures: there are twelve physical postures which correspond to the signs of the zodiac. During the sun's apparent journey through the heavens it passes through each of these celestial houses in turn. It remains in each zodiac for about thirty days and is said to triumph over each sign as it enters its domain.

Each position in Surya Namaskara corresponds to one of these signs of the zodiac.

2. Breathing: the whole movement of Surya Namaskara from start to finish is synchronized with breathing. Each position is associated with inhalation, exhalation or retention of breath. Nothing is forced or unnatural, for the breathing corresponds to the pattern one would normally do in relation to the physical movement. Correct automatic breathing should occur naturally without any prior instructions. However, details of the correct relationship between movement and breath are given to ensure it is done perfectly, for it is air important part of the practice. Without synchronization between the breath and the movement many of the benefits of Surya Namaskara are missed.

3. Mantras: associated with each of the twelve positions of Surya Namaskara is a specific Mantra. A mantra is a combination of syllables, sounds or phrases, realized by ancient sages, which have been widely known in India for thousands of years. They are evocative sounds and through their power of vibration have subtle, yet powerful and penetrating effects on the mind and body. While doing Surya Namaskara, a particular mantra is repeated either silently or uttered aloud with each poison.

When Surya Namaskara is combined with correct breathing and these Bija Mantras (seed sounds), the entire mind and intellect are energized. These Bija Mantra as create a vibration and it is this which creates the energy.

Mantras may or may not have specific meanings. But the vibrations which they create should reach every fibre of one's being. The Mantras of Surya Namaskara are energized sound. When repeated loudly, clearly and with devotion, these Mantras give the greatest possible benefits to those who utter them, either hastening the curing of an ailment, acquiring stability of mind and self-control, or dissolving tensions caused by modern living.

The full Mantras, one for each movement of the exercise are:

1. Om Hram Mitraya Namah
2. Om Hrim Ravaye Namah
3. Om Hrum Suryaya Namah
4. Om Hraim Bhanave Namah
5. Om Hraum Khagaya Namah
6. Om Hrah Pushne Namah
7. Om Hram Hiranyagarbhaya Namah
8. Om Hrim Marichaye Namah
9. Om Hrum Adityaya Namah
10. Om Hraim Savitre Namah
11. Om Hraum Arkaya Namah
12. Om Hrah Bhaskaraya Namah

The meanings of these names of the sun are as follows :

1. Mitra - friend
2. Ravi - shining
3. Sun - beautiful light
4. Bhanu - brilliant
5. Khaga - who moves in the sky
6. Pushan - giver of strength
7. Hiranyagarbha - golden centred
8. Marichi - lord of the dawn
9. Aditya - son of Aditi

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10. Savita - beneficent
11. Arka - energy
12. Bhaskara - leading to enlightenment

4. Awareness: this is an essential element of Surya Namaskara. Without awareness the many beneficial results are reduced.

5. Relaxation : this is not strictly a part of Surya Namaskara. However, it is a necessary supplementary practice that should be done without fail on completing your rounds. Any relaxation technique can be adopted, but the best method is Shavasana.

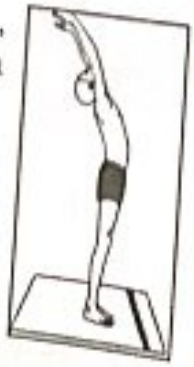
Methods

Position 1 : Pranamasana (prayer pose)

1. Stand erect with the feet together.
2. Face the sun or the direction of the sun.
3. Place the two palms together in front of the chest in an attitude of prayer, the Namaskara Mudra.
4. Close the eyes and relax the whole body.
5. Be aware of the body for at least half a minute.
6. This will prepare you for the forth coming practice.
7. Try to consciously relax the muscles of the body.

Breathing: Breathe normally with full awareness.

Position 2: Hastauithan Asana (raised arms pose)



1. Raise both arms above the head, keeping hands separated by a shoulder's width.
2. At the end of the movement bend the head, arms and upper trunk backwards.
3. The palms should face forwards.
4. The movement should be executed in one smooth motion with awareness.

Breathing: Inhale while raising the arms.

Position 3: Padahastasana (hand to foot pose)

1. Bend forward and place the palms of the hands on the floor, either in front of or on each side of the feet.
2. The movement should be continuous and without any jerking.
3. Keep the legs straight. If possible, try to touch your knees with your forehead or chin; (be careful of your nose for you may cause injury when doing Surya Namaskara quickly).
4. Under no circumstances should undue force be used in order to attain the final position.

Breathing: Exhale as deeply as possible while bending forwards and if possible accentuate the contraction of the abdomen, especially in the final position.

Position 4 : Ashwa Sanchalanasana(equestrian pose)

1. Stretch the right leg backwards as far as you can.
2. Simultaneously bend the left leg at the knee, but keeping the left foot in the same position.
3. The palms should remain on the floor and the arms should remain straight.
4. Beginners: If this is too difficult for beginners the palms can be raised off the ground, with only the finger tips in contact with the floor. This helps to increase the arch of the back. In the final position the toes and knee of the extended right leg should be in contact with the ground. Complete the movement by bending the head backwards and arching the spine as much as possible without straining.

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5. The movement should be executed smoothly and with awareness.

Breathing : inhale deeply as you move the body.

Position 5 : Parvatasana (mountain pose)

1. Raise your right knee.
2. Simultaneously lower your head towards the floor and bend the back so that the buttocks move upwards.
3. Stretch the left leg backwards and place the left foot beside the right foot.
4. Then raise the buttocks as high as possible into the air and further lower the head so that it lies between the two arms.
5. The legs should be straightened in the final position.
6. Try to press the heels of both feet towards the ground.
7. Throughout the practice the arms must remain straight, and the hands and right foot should remain in contact with the floor.
8. Though attainment of position five requires the movement of various parts of the body, all the movements should be synchronized to form one harmonious and smooth motion.

Breathing : Exhale deeply as you perform the movement.

Position 6 : Ashtanga Namaskara (worship with eight points)

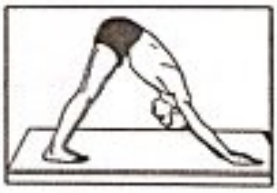
1. This position is so called because in the final pose eight points of the body are in contact with the ground.
2. Lower the body to the ground, first bending the legs and placing the knees in contact with the floor.
3. Bend the arms and lower the head and trunk towards the ground.
4. Try to brush your forehead along the surface of the floor as you move the head and trunk forwards.
5. At the end of the forward movement of the head and trunk, let the chest brush along the surface of the floor and rest the chin on the ground.
6. Finally raise the abdomen and hips slightly of the ground.
7. In the final position the eight points should be on the ground: the chin, the chest, two palms, two knees and the balls of both feet.
8. The whole movement should be smoothly executed.

Breathing : Hold the breath outside, i.e. don't breathe in.

Position 7 : Bhujangasana (cobra pose)

1. Lower the hips to the ground.
2. Simultaneously straighten the arms so that the head and back arch upwards.
3. In the final position the head and back should be bent backwards as far as is comfortable, but try to keep the abdomen as close as possible to the floor, without straining.
4. The position of the hands and feet should not change throughout the movement.
5. Breathing: Inhale deeply during the movement.

Position 8 : Parvatasana (mountain pose)



1. This position is a repeat of position 5.
2. From the arched position of Bhujangasana bend the back in the opposite direction so that the buttocks move upwards.
3. Keep the arms and legs straight and don't move the position of the hands and feet.
4. In the final pose the buttocks should be as high as possible, the head should be between

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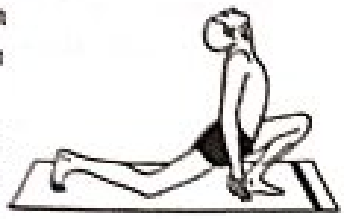
the arms and the heels should be gently pressed towards the floor.

Breathing : Exhale while performing the movement.

Position 9 : Ashwa Sanchalanasana(eques train pose)



1. This position is a repeat of position 4.
2. Bend the left leg and place the left foot between the two hands. Simultaneously raise the head upwards, arch the back downwards and lower the right knee to the floor.
3. The position of the two hands and the right foot must not change.
4. The arms should remain straight throughout.
5. In the final pose, accentuate the arching of them back and bend the head backwards as far as possible.

Breathing : Inhale deeply while assuming the final pose.

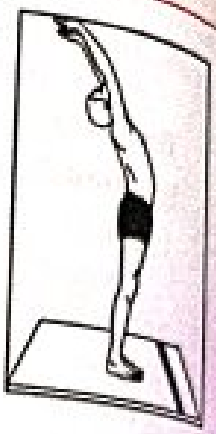
Position 10 : Padahastasana (hand to foot pose)

1. This position is the same as position 3.
2. Lower the head towards the ground.
3. Simultaneously raise the buttocks and right knee upwards.
4. Then, when you are able, place the right foot beside the left foot in between the hands.
5. Straighten the legs and try to touch the forehead to the knees.

Breathing : Exhale deeply as you move the head towards the knees.

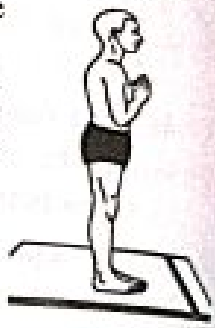
Position 11 : Hasta Utthanasana (raised arms pose)

1. This position is the same as position 2.
2. Smoothly straighten the whole body.
3. Keep the arms straight and separated by about a shoulder's width.
4. Raise the arms over the head and lean the head, arms and back slightly backwards.
5. To do this the abdomen must be pushed a little forwards.



Breathing : Inhale throughout the movement.

Position 12 : Pranamasana (prayer pose)



1. This is the final pose and the same as position 1.
2. Bring the palms together and hold them in front of the chest.
3. Relax the whole body.
4. Breathing : Exhale while assuming the final pose.

Breathing : Breathe normally while remaining in the final position prior to continuing the practice.

Precautions

Surya Namaskara is a powerful method of eliminating toxins from the body. However, these toxins should not be eliminated too quickly, for they may manifest in a number of uncomfortable ways, such as huge painful boils. If any such symptoms or sign of fever begins to show, reduce the number of rounds of Surya Namaskara or even stop altogether for a few days. The toxins must be eliminated from the body, but it should be done gradually over a period of weeks or months, utilizing Surya Namaskara, Asanas and Pranayama.

Benefits

Digestive system : The abdominal organs and stomach are alternately stretched and compressed. This imparts a healthy massage to the internal organs and ensures that they function correctly, or if they don't currently work efficiently, encourages them to do so.

Many diseases of the digestive system can be prevented and removed by the regular practice of Surya Namaskara.

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Eliminative system: Rapid elimination of waste materials from the body is essential.

Often undigested waste products remain in the intestines and bowels due to constipation, which can result in various other disorders. Surya Namaskara stimulates the peristalsis of the intestines helping to remove any tendency towards constipation.

The kidneys are also important eliminative organs. They filter impurities from the blood and eliminate them from the body in the form of urine.

Skin -A high proportion of the body's waste products are eliminated through the skin. This process works particularly well when a person sweats profusely. Often toxins accumulate in the skin, manifesting as boils and pimples. If a good sweat was developed regularly there would be fewer tendencies for this to happen as the toxins would reach the outer surface of the skin and be washed off. Surya Namaskara results in increased perspiration and there by encourages the elimination of toxins from the body, helping to prevent skin ailments.

Circulatory system: Surya Namaskara increases the heart beat and the workings of the whole circulatory system, helping to eliminate waste materials from the body. Areas of sluggish blood are also removed and replaced by purified and oxygenated blood. All the cells of the body receive extra nutrition enabling them to function more efficiently.

This leads to better health and increased vitality. The lymphatic system is also speeded up. This system is most important in protecting the body against infection.

Respiratory system: Most people tend to breathe superficially in short and shallow gasps. This starves the body of the oxygen it requires for perfect health. Carbon dioxide also tends to accumulate in the system. Further underutilization of the lung capacity allows a build up of germs which can lead to various illnesses.

Surya Namaskara, when done correctly, accentuates the exchange of air to and from the lungs, opens and expands the intricate alveoli, or air sacs, of the lung tissue and exercises the muscles of the surrounding chest region. The lungs are emptied of impurities and stale air and the body and brain are revitalized by the extra supply of oxygen they receive. One can almost feel the extra supercharge of energy.

Endocrinal system: This system plays an important part in determining our well-being and attitude towards life. It consists of a large number of different chemicals (hormones) which interact with each other, reinforcing or counteracting each other. Even the slightest imbalance can cause widespread repercussions in the form of disease. A well-known example is diabetes. There are many other illnesses which are a direct result of hormonal imbalance. The hormones are the officers of the body, the brain is the commander and the parts of the body are the soldiers. It is the hormones that mobilize and coordinate the different functions of the body. Rate of growth, sexual functions, excitability and so on are all controlled by hormones.

Surya Namaskara harmonizes this system helping to remove any irregularities by directly massaging the relevant glands and improving their blood flow. Imbalance of the endocrinal system is often caused by mental tension. Surya Namaskara can help to remove or reduce this deeper cause of hormonal malfunction, especially if it is supplemented by other Yoga practices.

Nervous system: The multitudes of nerve connections throughout the body are gently stretched, massaged and stimulated while doing Surya Namaskara. It is these nerves that connect the different parts and organs of the body with the brain. The nerves are the intermediaries. Even if an organ is in perfect condition it can only function as well as the nerves will allow. If the nerves are unhealthy then the functioning of the associated organs must suffers. If the pipe connecting the water tank to the tap is blocked, then the tap cannot work properly, even though it might be perfectly new. It is the same with the bodies nervous system. The nerve fibres determine how well the organs and muscles of the body function.

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Muscles and skeleton: Surya Namaskara exercises all the main muscles and joints in the body. The muscles are contracted and extended and any impure, stagnant blood is redirected back to the lungs and kidneys for purification. It is an excellent method of loosening up the body for Asana practice.

Pranayama

The word Pranayama is a combination of "Prana" and "Ayama". Prana means breath and Ayama means to extent. Pranayama is an exact science. It is the fourth Anga or limb of Ashtanga Yoga.

तस्मिन सति श्वास प्रश्वासयोर्गति विच्छेदः प्राणायामः ।

(प.यो.सू. 2/49)

Regulation of breath or the control of Prana is the stoppage of inhalation and exhalation, which follows after securing that steadiness of posture or seat, Asana. Prana is the vital energy required for sustaining the dynamic operation and coordination of each organ within a body. The continuous flow of Prana in the Nadis, or subtle nerves in the body, is important for a disease-free body. Pranayama is control and smooth flow of Prana through Yoga exercises. Pranayama or Prana-control can be achieved by the modification of breathing patterns. Pranayama exercise is done through proper regulation of inhaling, holding the breath and exhaling. While Pranayama can be practiced alone, it can be integrated with several of the Asanas (postures) for improved benefits.

After the mastery over the Asana, controlling the inspiration and expiration is known as Pranayama. One should consume wholesome diet while doing Pranayama. Pranayama helps to establish control over mind and thus helps in the mastery of the other Angas of Yoga.

चले वाते चलं चित्तं निश्चले निश्चलं भवेत ।
योगी स्थाणुत्वमाप्नोति ततो वायुः निरोधयेत ॥

(ह.यो.प्र. 2/2)

When Pranavayu is moving, even the mind will be under stable. When Pranavayu attains stability, even the mind becomes stable. When both Vayu and mind become stable, then only Yogi can attain Sthanutva. So one should control the Vayu through Pranayama process.

Pranayama (According to the Gita)

अपाने जुह्वति प्राणं प्राणेऽपानं तथापरे ।
प्राणापानगती रुद्ध्वा प्राणायामपरायणाः ॥

(गीता 4.29)

Others offer Prana (outgoing breath) in Apana (incomingbreath) and Apana in Prana, restraining the passage of Prana and Apana, absorbed in Pranayama.

Pranayama is a precious Yajna (sacrifice). Some practise the kind of Pranayama called Puraka (filling in). Some practise the kind of Pranayama called Rechaka (emptying). Some are engaged in the practice of Pranayama called Kumbhaka, by impeding the outward passage of air, through the nostrils and the mouth, and by impeding the inward passage of the air, in the opposite direction.

Pranayama (According To Sri Sankaracharya)

"Pranayama is the control of all life-forces by realising naught but Brahman in all things as the mind, etc.

बाह्याभ्यन्तरस्तम्भवृत्तिर्देशकालसंख्याभिः परिदृष्टो दीर्घसूक्ष्मः । बाह्याभ्यन्तरविशयाक्षेपी चतुर्थः ॥

(प.यो.सू. 2/51-52)

Generally there are four stages in Pranayama.

1. Bahya Vritti/ Rechaka- Exhalation
2. Abhyantara/ Puraka – Inhalation
3. Stambha Vritti/ Kumbhaka – Holding of the breath
4. Caturthaka- There is also a fourth stage called caturthaka which is beyond inhalation and exhalation.

प्राणायामस्त्रिधा प्रोक्ता रेचेपूरककुम्भकैः ।
सहितः केवलश्चेति कुम्भको द्विविधो मतः ॥

(ह.यो.प्र. 2/71)

According to Hathayoga Pradipika, Pranayama is of three types

1. Rechaka/Exhalation

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2. Puraka/Inhalation
3. Kumbhaka/ Retention

Benefits of Pranayama

Doing Pranayama does not mean only taking the air in the body (inhalation) and throwing it out (exhalation) but along with oxygen, we also take in our body the vital energy. This vital energy permutes the entire universe and what we inhale and exhale is a fragment of it.

The control of regulation of Prana is called Pranayama. All function of our body are directly or indirectly related to Prana without, Prana there would be no life. It is Prana which is the cause of life and death. Pranayama has the capacity of freeing the mind from untruthfulness, ignorance and all other painful and unpleasant experience of the body and mind. When mind becomes clean it becomes easy for the yogi concentrate on the desired object and it becomes possible for him to progress further in the direction of Dharan, Dhyana and Samadhi.

Pranayama influence the subtle and the physical bodies in a greater measure than Yogasana do and that too in a perceptible manner. Physically Pranayama appear to be a systematic exercise of respiration, which makes the lungs stronger, improves blood circulation, and makes the man healthier for long life.

प्राणायामेन युक्तेन सर्वरोगक्षयो भवेत ।
अयुक्ताभ्यासयोगेन सर्वरोगसमुध्दवः ॥
(ह.यो.प्र. 2/16)

By proper practice of Pranayama all diseases are eradicated. Through improper practice all diseases can arise.

यावद्धायुः स्थितो देहे तावज्जीवनमुच्यते ।
मतणं तस्य निष्कृतिस्ततो वायुं निरोद्जयेत ॥
(ह.यो.प्र. 2)

As long as the Vayu (Prana) remains in the body, there is life. Death occurs when the Vayu leaves the body, therefore, retain the Vayu.

युक्तं युक्तं त्यजेद्वायुं युक्तं युक्तं च पूरयेत ।
युक्तं युक्तं च बध्नीयादेवं सिद्धिमवाप्नुयात ॥
(ह.यो.प्र. 2/18)

One should inhale, exhale and retain in a regulated manner so that perfection is attained. Physiologically teaches us that the Prana we breathe in fill our lungs, spreads in the entire body, providing it with essential food and oxygen. Not only that the veins coolest the gross elements from the body, take them to the heart and then to the lungs which throws the useless material like carbon dioxide out of the body through the act of exhalation. If this action of the respiratory system is done regularly and efficiently, lungs become stronger and blood becomes pure. By regular practicing Pranayama a man to lead a healthy and long life.

Mental disturbance like anxiety, fear, anger, disappointment, lust for sex and other mental problem can calm down by regular practice of Pranayama. Pranayama practices improves the function of brain cells with the result that memory and the faculty of discrimination and observation improves, making it easy for the Yogi to perform concentrate and meditation.

Patanjali explain in Sutra a man who regularly performs Pranayama is required to take lesser number of breaths and therefore lives longer. e.g. Tortoise whose rate of respiration per minute five times lives for about 400 year. Pranayama keeps the body fit and healthy. It reduces excessive fat. One can live a long life through Pranayama. Pranayama improves the power of memory and eliminates mental disorders.

Pranayama tones up the stomach, the liver, the bladder, the small and the large intestines and the digestive system, purifies tubular channels and removes sluggishness from the body, and kindles gastric fire; the body becomes healthy and the inner voice begins to be heard. Constant practice of Pranayama strengthens the nervous system. The mind becomes calm and capable of concentration, and rouses spiritual power. Most importantly negative thinking comes to an end. The person practicing Pranayama is always full of positive thoughts.

आदौ स्थानं तथा कालं मिताहारं तथापरम ।
नाड़ीशुद्धि ततः पश्चात प्राणायामं च साधयेत ॥
दूरदेशे तथारण्ये राजधान्यां जनान्तिके ।

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योगारम्भं न कुर्वीत कृतश्चेत सिद्धिहा भवेत ॥
(घे.स. 5,4)

Four things are necessary in practicing Pranayama. A good place, suitable time, moderate food and purifications of the Nadis. The practice of Yoga should not be attempted in a far off home, nor in a forest, nor in a capital city, nor in the midst of a crowd, if one does so, he loses success.

सम्यग्गोमयलिप्तं च कुटिरान्तत्रनिर्मितं ।
एवं स्थानेषु गुप्तेषु प्राणायाम समभ्यसेत ॥
(घे.स. 5/7)

Place should be completely plastered over with cow dung. In hut thus built and situated in such a hidden place, let him practice Pranayama.

Duration of Pranayama

हेमन्ते शिशिरे ग्रीष्मे वर्षायां च ऋतौ तथा ।
योगारम्भं न कुर्वात कृते योगो हि रोगदः ॥
(घे.स. 5/8)

The practice of Yoga should not be commenced in these four seasons out of six- Hemanta, Sisira, Grishma and Varsha. If one begins in these seasons, one will contact diseases.

वसन्ते वाऽपि शरदि योगारम्भ समाचरेत ।
तथा योगो भवेत सिद्धो विनायासेन कथ्यते ॥
(घे.स. 5/8,9)

The practice of Yoga should be commenced either in Vasanta and Sarada. For in these seasons success is attained without much trouble.

प्रातर्मध्यं दिने साय अर्धरात्रे च कुभकान ।
शनैरशीतिपर्यंतं चतुर्वारं समभ्यसेत ॥
(ह.यो.प्र. 2/11)

Pranayama or Kumbhaka can be performed four times in a day. i. e. mornings, mid afternoon, evening and mid night are the time ideal for practice of Pranayama. One should gradually practice Pranayama for one time 80 and per day and night together it is 320.

Pranayama Tividha Lakshana

कनीयसि भवत स्वेद कम्पो भवति मध्यमे ।
उत्तमे स्थानमाप्नोति ततो वायु नियन्धयेत ॥
(ह.यो.प्र. 2/12)

a. **Kanishtha Pranayama** - This is the beginning stage of Pranayama, in this there will be sweda.

b. **Madhyama Pranayama** - Middle stages Pranayama in this there will Kampa.

c. **Uttama Pranayama** - The last stage of Pranayama, Yogi will attain steadiness and Vayu reaches Bramharandhra which is the best seat. But this is very difficult task.

Kanishtha (Tamas), Madhyama (Rajas) Pranayama is Vikasarahita, Uttama Pranayama is Nirvikara and Satvika. It is useful in achieving Yoga Siddhi.

In general the ratio of Puraka, Kumbhaka and Rechaka is 1:4: 2

Kanishtha Pranayama - Avara Pranayama - 12 matras -12sec: 48 sec: 24 sec.

Madhyama Pranayama-16 matras - 16sec: 64 sec: 32 sec.

Uttama Pranayama - 20 matras- 20 sec: 80 sec: 40 sec.

Pranayama Yukta Laxana

प्राणायामादि युक्तेन सर्वरोगक्षयो भवेत ।
(ह.यो.प्र. 2/16)

If Pranayama is practiced in a proper way it is capable of curing all diseases.

प्राणायामं ततः कुर्यान्नित्यं सात्विकाया धिया ।
यथा सुषुम्नाडीस्था मलाः शुद्धि प्रयान्ति च ॥
(ह.यो.प्र. 2/6)

One should practice Pranayama regularly with Satvika mind, so that the morbid matter present in the Sushumna Nadi gets purified and the flow of Prana through it becomes regulated.

Pranayama Ayukta Laxana

अयुक्ताभ्यासयोगेन सर्व रोग करो भवेत ॥
(ह.यो.प्र. 2/16)

Improperly practice Pranayama leads to the onset of all kinds of diseases.

यथा सिंहो गजो व्याघ्रो भवेदृश्यः शनैः शनै ।
तथैव सेवितो वायुरन्यथा हन्ति साधकम ॥
(ह.यो.प्र. 2/15)

The Simha, Gaja and Vyaghra can be gradually

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brought under control, similarly the Prana Vayu can be controlled gradually, otherwise it destroys practitioner.

हिक्का श्वासश्च कासश्च शिरः कर्णाक्षि वेदनः ।
भवन्ति विविधा रोगाः पवनस्य प्रकोपतः ॥
(ह.यो.प्र. 2/17)

Due to aggravation of Vata the diseases like Hikka, Swasa, Kasa, Shiravedhana and Akshi Vedana are produced.

Malashodhaka Pranayama

मलाकुलासु नाडिषु मारुतो नैव मध्यगः ।
कथं स्यादुन्मनीभावः कार्यसिद्धिः कथं भवेत ।
शुद्धिमेति यदा सर्वं नाडीचक्रं मलाकुलम ।
तदैव जायते योगी प्राणसंग्रहणे क्षमः ॥
(ह.यो.प्र. 2/4-5)

Sitting in Padmasana posture the Yogi should fill in the air through the left nostril (close right nostril)and keeping it confined according to one's ability it should be expelled slowly through the Surya (right nostril).

Then, drawing in the air through the right nostril, slowly, the belly should be filled and after performing Kumbhaka as before. It should be expelled slowly through the left nostril.

Inhaling thus through the one, through which it was expelled and having restrained at their till possible it should be exhaled through the other, slowly not forcibly. By practicing alternatively, the whole of the collection of the Nadis become clean. i.e. free from impurities after three months and over.

Pranayama Abhyasa Kala Ahara

अभ्यास काले प्रथमे शस्तं क्षीराज्यभोजनम ।
ततोऽभ्यासे दृढिभूते न तादृङनियमग्रह ॥
(ह.यो.प्र. 2/14)

शाल्यन्नं यवपिष्ट वा गोधूमपिष्टकं तथा ।
मुद्गं माषचणकादि शुभ्रं च तुषवर्जितम ॥
पटोलं पनसं मानं कक्कोलं च शुकाशकम ।
द्राक्षिकां कर्कटीं रम्भां डुम्बरीं कण्टकण्टकम ॥
आरम्भां भालरम्भां रम्भादण्डं च मूलकम ।
वार्ताकी मूलकं ऋद्धिं योगी भक्षणमाचरेत ॥
बालशाकं कालशाकं तथा पटोलपत्रकम ।
पञ्चशाकं प्रशंसीयाद्वास्तूकं हिलमोचिकाम ॥
शुद्धं सुमधुरं स्निग्ध ऊदगार्द्धविवर्जितम ।
भुज्यते सुरसं प्रीत्या मिताहारमिमं विदुः ॥
अन्नेन पूरयेदर्धं तोयेन तु तृतीयकम ।
उदरस्यं तुरीयांशं संरक्षेद्वायुचालणे ॥
(घे.स. 5/17-22)

During the first stage practice of Pranayama on should take food consisting of milk and Ghrita. When the practice becomes accomplished no such restriction is necessary, normal Yogabhyasa Ahara can be taken. The food consumed should be Satvika in nature.

A Yogi should eat rice, barley, or wheat bread. He may eat Mudga, Masha, Chanaka etc. these should be clean, white and free from chaff. A Yogi may eat Patola, Panasa, Manakachu, Kakkola, Jujube, bondue nut, cucumber, plantain, fig, unripe plantain, plantain stem and Roots, medicinal roots and fruits etc.

He may eat green, fresh vegetables, black vegetables, the leaves of Potola, Vastuka-Shaka, Himalocika Shaka. These are the five Shakas praised as fit food for Yogis.

Half the stomach should be filled with food, one quarter with water and one quarter should be kept empty for practicing Pranayama.

Varja Ahara during Pranayama

कटवम्लं लवणं तिक्तं भृष्टं च दधि तक्रकम ।
शाकोत्कटं तथा मद्यं तालं च पनसं तथा ॥
शाकोत्कटं तथा मद्यं तालं च पनसं तथा ।
कुलत्थं मसूरं पाण्डुं कूष्माण्डं शाकदण्डकम ।
तुम्बीकोलकपित्थं च कण्टबिल्वं पलाशकम ।
कदम्बं जम्बीरं बिम्बं लकुचं लशुनं विषम ॥
कामरङ्गं पियालं च हिंगुशालमलीकेसुकम ॥
(घे.सू. 5/23)

In the beginning of Yoga practice one should avoid Katu, Amla, Lavan, Tikta, Brushta (roasted things), Dadhi, Takra, Shaka, Madya, Tala and over ripened Panasa(jack fruit).

Kulattha and Masura, Pandu fruit, pumpkins and vegetable stems, gourds, berries, Kathabel, Kantabilva and Palasha. So also Kalama, Jambira, Bimba, Lashuna, Kamaranga, Hinga, Salmali etc.

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Nadi Suddhi Pranayama

बद्धपद्मासनो योगी प्राणं चन्द्रेण पूरयेत । धारयित्वा यथाशक्ति भूयः सूर्येण रेचयेत ॥
प्राणं सूर्येण चाकृष्य पूरयेदुदरं शनैः । विधिवत्कुंभकं कृत्वा पुनश्चन्द्रेण रेचयेत ॥ (ह.यो.प्र.)

The Sanskrit word Nadi means 'psychic passage' or 'specific pathway' through which Prana flows throughout the body. The word Shodhana means 'purification'. Thus this is a practice where by the pranic pathways are purified and decongested. This allows the Prana to flow freely throughout the body, bringing the physical body into the best possible health and calming the mind. It is an excellent preparation for meditational techniques.

Method

1. Sit in Padmasana, Siddhasana, Vajrasana or Sukhasana with the spine erect.
2. Perform Jalandhara Bandha and keep the hands in Jnana Mudra with left hand.
3. Bend the right hand at elbow and perform Nasagra Mudra i.e. bend the index finger and middle finger , brings the ring finger and little finger near the thumb.
4. Touch the right nostril with the thumb and left nostril with the thumb and left nostril with the ring finger and little finger.
5. Close the left nostril and inhale deeply through right nostril and fill the lungs completely with the air.
6. Perform Mulabandha and with hold the breathe i.e. Kumbhaka.
7. Exhales through the left nostril completely, while right nostril is closed then again perform Kumbhaka with Mulabandha.
8. Then inhale deeply through left nostril by closing the right nostril.
9. Perform Kumbhaka in Mulabandha.
10. Exhale deeply through right nostril, while left nostril is closed. This is one cycle.
11. Repeat the cycles for 5 to 10 minutes.

Benefits

1. Nadi Shodhana is an excellent preparatory technique for more advanced forms of Pranayama and an excellent prelude to meditational or relaxation techniques.
2. It induces calmness of mind by regulating the flow of Prana in the body. It helps to remove congestion or blockage of the Nadis and thereby allows the free flow of Prana.
3. The whole body is nourished with an extra supply of oxygen and the carbon dioxide is more efficiently eliminated. This purifies the whole blood system and increases the overall health of the body, including its power to resist disease.
4. Deep, slow breathing encourages the removal of stagnant air from the lungs.

Nadi Shuddhi Lakshana

यदा तु नाडीशुद्धिः स्यात्तदा चिन्हानि बाह्यतः ।
कायस्य कृशता कान्ति स्तदा जायेत निश्चितम ॥
यथेष्ट धारण वायोरनलस्य प्रदीपनम ।
नादाभिव्यक्तिरारोग्यं जायते नाडी शोधनम ॥
(ह.यो.प्र. 2/19-20)

Purification of channels of the body produces following internal and external features. They are lightness of body, glowing color of body, and feeling of certain of success. Increases Agni to withholding of Vayu, awakening of divine sound, body becomes healthy.

यावद वायुः स्थितो देहे तावज्जीवनमुच्यते ।
मरणं तस्य निष्क्रान्तिनिस्ततो वायुं निरोधयेत ॥
(ह.यो.प्र. 2/3-4)

The person is said to be alive till the Prana Vayu is present in the body. As soon as the Prana Vayu goes out, he is said be dead. So one should learn to control the longevity of life.

Anuloma-Viloma Pranayama

1. Both nostrils- Sukha Pranayama
2. Single nostril-
   a. Candranuloma Viloma
   b. Suryanuloma Viloma
3. Alternate nostrils-
   a. Candra Bhedana
   b. Surya Bhedana
   c. Nadi Shodhana

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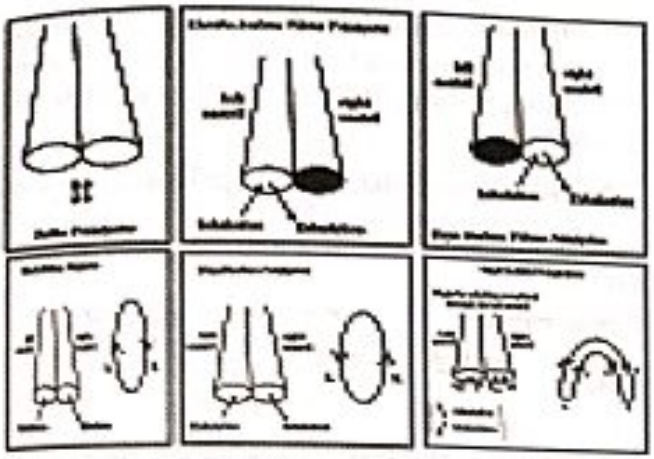

Both Nostrils - Breathing in and out goes on through both nostrils. This is Sukha Pranayama also called Dirgha Shvasana. This is the simplest of the Pranayama

Single Nostril - In this breathing is done either through the left or the right. These are called Candranuloma Viloma or Suryanuloma Viloma, respectively.

Alternate Nostrils - In this series three combination of inhalation exhalation can be seen

a. Inhale through left and exhale through right- Chandra Bhedana
b. Inhale through right and exhale through left- Surya Bhedana
c. Inhale through left, exhale through right and inhale through right and exhale through left- Nadi Suddhi.

To close left and right nose alternately make a Mudra (hand pose) with right hand. Keep only thumb, little and ring fingers extended and keep index and middle fingers flexed.

1. Inhale via right and breath-out via left nose. Second time inhale via left and breath-out via right nose. During early learning phase try to do 10 to 15 breaths in one session, and come down to normal breathing in-between. Try to maintain the rate of breathing about 8 to 10 per minute. Determine to do regularly 3 to 4 such sessions daily. You will observe its benefits within a week. In Yoga two important Nadies, Ida (Surya–Nadi) and Pingla (Chandra–Nadi) are described. Ida runs in right nose and Pingla runs in left nose.
2. Inhale via right and breath-out via left nostril every time. This will be Surya Pranayama. Do such 30 breathings in one session. Take rest. This will become one session of a Surya Pranayama. It is claimed that Surya Pranayama done in one session, and such 4 sessions done in a day, reduces body weight by 1 lb/month without any diet changes. If combined with proper food and calories control it helps to reduce obesity.
3. The reverse of Surya Pranayama is Chandra Pranayama.
4. Inhale via left and breath-out via right nostril. Do this way every time. This will be Chandra Pranayama. Do such 30 Chandra Pranayama in one session. If such 4 sessions are done in one day, it helps to increase body weight by 1lb in month. Chandra Pranayama helps to gain weight by increasing appetite. In case you forget one session and then do it before going to bed.

Benefits

1. This Pranayama helps in Asthma cases and Recurrent Sinus problems.
2. Helps in Arthritis by producing joint fluids and regenerating cartilages in early cases of Osteo- Arthritis.
3. Helps in varicose veins of legs and blockage of Brain and Coronary arteries.

Kumbhakabheda-Suryabhedana, Ujjayi, Sheetali, Sitkari, Bhastrika, Bhramari, Murcha, Plavini

सुर्यं भेदनम उज्जायी सीत्कारी शीतली तथा।
भास्त्रिका भ्रामरी मुर्च्छा प्लावनीत्यष्ट कुम्भकाः॥
(ह.यो.प्र. 2/44)

Pranayama is eight types 1. Surya Bhedana, 2. Ujjayi, 3. Sitkari, 4. Sheetali, 5. Bhastrika, 6. Bhramari, 7. Murccha and 8. Plavani.

सहितः सुर्यभेदश्च उज्जायी शीतली तथा।
भस्त्रिका भ्रामरी मुर्च्छा केवली चाष्टकुम्भिकाः॥
(घे.स. 5/46)

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The Kumbhaka are eight types, Sahita, Surya bheda, Ujjayi, Sitali, Bhastrika, Bhramari, Murcha and Kevali.

Sahita Pranayam

सहितो द्विविधः प्रोक्तः सगर्भश्चनिगर्भकः।
सगर्भो बीजमुच्चार्य निगर्भो बीजवर्जितः॥
(घे.स. 5/47)

The Sahita Kumbhaka is two types Sagrabha and Nigarbha. The Kumbhaka performed by the repetition of Bija mantra is Sagarbha, which done without such reputations is Nigrabha.

1. Surya Bhedana Pranayama - (Gh.Sa. 5/58-59)

आसने सुखदे योगी बद्धवा चैवानकं ततः।
दक्षनाड्या समाकृष्य बहिः स्थं पवनं शनैः॥
(ह.यो.प्र. 2/48)

आकेशादाननखाग्राच्च निरोधावदि कुंभयेत।
ततः शनैः सव्यनाड्या रेचयेत्पवनं शनैः॥
(ह.यो.प्र. 2/49)

Sit in comfortable Asana, the Yogi inhale through the right nostril slowly and exhale through left nostril.

Procedure

1. Sit on Padmasana or Siddhasana. Close the eyes. Keep the left nostril closed with your right ring and little fingers.
2. Slowly inhale without making any sound as long as you can do it comfortably through the right nostril. Then close the right nostril with your right thumb and retain the breath firmly pressing the chin against the chest (Jalandhara Bandha).
3. Hold on the breath till perspiration oozes from the tips of the nails and roots of the hairs (hair follicles). This point cannot be reached attach very outside. You will have to increase the period of Kumbhaka gradually. This is the limit of the sphere of practice of Surya Bheda Kumbhaka.
4. Then exhale very slowly without making any sound through the left nostril by closing the right nostril with the thumb. Repeat OM mentally with Bhava and meaning during inhalation, retention and exhalation. Exhale after purifying the skull by forcing the breath up.
5. This Pranayama should again and again be performed.

Benefits

कपालशोधनं वातदोषघ्नं कृमिदोषहृत।
पुनः पुनरिदं कार्यं सूर्यभेदनमुत्तमम॥
(ह.यो.प्र. 2/50)

कुम्भकः सूर्यभेदस्तु जरामृत्युविनाशकः।
बोधयेत कुंडलीं शक्तिं देहानलं विवर्धयेत॥
(घे.स. 5/68)

1. It purifies the brain and destroys the intestinal worms and diseases arising from excess of wind (Vayu).
2. This removes the four kinds of evils caused by Vayu and cures Vata or rheumatism.
3. It cures rhinitis, cephalalgia and various sorts of neuralgia.
4. The worms that are found in the frontal sinuses are removed.
5. It destroys decay and death, awakens Kundalini Shakti and increases the bodily fire.

2. Ujjayi Pranayama

मुखं संयम्य नाडीभ्यामाकृष्य पवनं शनैः।
यता लगति कंठात्तु हृद्यावधि सस्वनम॥
(ह.यो.प्र. 2/51)

पूर्ववत्कुंभयेत्प्राणं रेचयेदिडया ततः।
श्लेष्मदोषहरं कंठे देहानलविवर्धनम॥
(ह.यो.प्र. 2/52)

नासाभ्यां वायुमाकृष्य मुखमध्ये च धारयेत।
हृदगलाभ्यां समाकृष्य वायुं वक्त्रे च धारयेत॥
(घे.स. 5/69)

Procedure

1. Sit in Padmasana or Siddhasana. Close the mouth.
2. Inhale slowly through both the nostrils in a smooth, uniform manner till the breath fills the space from the throat to the heart.
3. Retain the breath as long as you can do it comfortably and then exhale slowly through

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the left nostril by closing the right nostril with your right thumb.

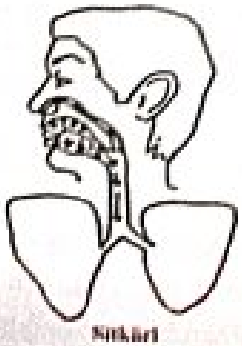
4. Expand the chest when you inhale. During inhalation a peculiar sound is produced owing to the partial closing of glottis. The sound produced during inhalation should be of a mild and uniform pitch. It should be continuous also.
5. This Kumbhaka may be practised even when walking or standing. Instead of exhaling through the left nostril, you can exhale slowly through both nostrils.

Benefits

नाडी जलोदराधातुगत दोष विनाशनम। गच्छता तिष्ठता कार्यमुज्जाय्याख्यं तु कुंभकम।
(ह.यो.प्र. 2/53)

उज्जायीकुम्भकं कृत्वा सर्वकार्याणि साधयेत न भयेत कफरोगश्च क्रूरवायुजीर्णकम॥
आमवातः क्षयः कासोज्वर प्लिहा न विद्यते। जरामृत्यु विनाशाय चोज्जायीं साधयेन्नरः॥
(घे.स. 5/72)

1. This removes the heat in the head.
2. The practitioner becomes very beautiful.
3. The gastric fire is increased.
4. It removes all the evils arising in the body and the Dhatus and cures Jalodara (dropsy of the belly or ascites).
5. It removes phlegm in the throat, Asthma, consumption and all sorts of pulmonary diseases are cured. All diseases that arise from deficient inhalation of oxygen, and diseases of the heart are cured.
6. The practitioner is never attacked by diseases of phlegm, nerves, dyspepsia, dysentery, enlarged spleen, consumption, cough or fever. Perform Ujjayi to destroy decay and death.


Sitkari

Sitali

3. Sitkari Pranayama

सीत्कां कुर्यात्तथा वक्त्रे घ्राणेनैव विजृंभिकाम।
एवमभ्यासयोगेन कामदेवो द्वितीयकः॥
योगिनीचक्र सामान्यः सृष्टिसंहारकारकः।
(ह.यो.प्र. 2/54-55)

1. Fold the tongue so that the tip of the tongue might touch the upper palate and draw the air through the mouth with a hissing sound C C C C (or Si, Si, Si, Si).
2. Then retain the breath as long as you can without the feeling of suffocation and then exhale slowly through both nostrils.
3. You can keep the two rows of teeth in contact and then inhale the air through the mouth as before.

Benefits

न क्षुधा त तृषा निद्रा नैवालस्यं प्रजायते॥
भवेत्सत्वं च देहस्य सर्वोपद्रवबर्जितः।
अनेन विधिना सत्वं योगीद्रो भूमिमंडले॥
(ह.यो.प्र. 2/56)

1. The practice enhances the beauty of the practitioner and vigour of his body.
2. It removes hunger, thirst, indolence and sleep.
3. His strength will be just like that of Indra. He becomes the Lord of Yogins. He is able to do and undo things. He becomes an independent monarch.
4. He becomes invincible. No injury will affect him. When you are thirsty, practise this. You will be relieved of thirst immediately.

4. Shitali Pranayama (Ghe. Sa. 5/73)

जिह्वा वायुमाकृष्य पूर्ववत्कुंभसाधनम।
शनकैर्घ्राणरंध्राभ्यां रेचयेत्पवनं सुधीः॥
(ह.यो.प्र. 2/57)

जिह्वा वायुमाकृष्य उदरे पूरयेच्छनैः।
क्षणं च कुम्भक कृत्वा नासाभ्यां रेचयेत पुनः॥
(घे.स. 5/73)

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Procedure

1. Protrude the tongue a little away from the lips.
2. Fold the tongue like a tube.
3. Draw in the air through the mouth with the hissing sound Si.
4. Retain the breath as long as you can hold on with comfort.
5. Then exhale slowly through both nostrils.
6. Practise this daily again and again in the morning from 15 to 30 times.
7. You can do this either on Padmasana, Siddhasana, Vajrasana or even when you stand or walk.

Benefits

गुल्मप्लिहादिकान रोगान ज्वरं पित्तं क्षुधां तृषाम।
विषाणि शीतलीनाम कुंभकेयं निहंति ॥
(ह.यो.प्र. 2/58)

सर्वदा साधयेद्योगी शीतलीकुम्भकं शुभम।
अजीर्णं कफपित्तञ्च नैव तस्य प्रजायते ॥
(घे.स. 5/74)

1. This Pranayama purifies the blood.
2. It quenches thirst and appeases hunger.
3. It cools the system.
4. It destroys Gulma (chronic dyspepsia), Plecha, inflammation of various chronic diseases, fever, consumption, indigestion, bilious disorders, phlegm, the bad effects of poison, snake-bite, etc.
5. If you feel thirsty, practise this Pranayama. You will be at once relieved of thirst.
6. He who practises this Pranayama regularly will not be affected by the bite of serpents and scorpions. Sitali Kumbhaka is an imitation of the respiration of a serpent.
7. He becomes a proof against all sorts of inflammations and fever.

5. Bhastrika Pranayama

In Sanskrit Bhastrika means 'bellows'. Rapid succession of forcible expulsion is a characteristic feature of Bhastrika. Just as a blacksmith blows his bellows rapidly, so also you should move your breath rapidly.

ऊर्वोरुपरि संस्थाप्य शुभे पादतले उभे।
पद्मासनं भवेदेतत्सर्वपाप प्रणाशनम ॥
(ह.यो.प्र. 2/59)

सम्यक पद्मासनं बध्वा समग्रीवोदरं सुधीः।
मुखं संयम्य यत्नेन घ्राणं घ्राणेन रेचयेत ॥
(ह.यो.प्र. 2/60)

पुनर्विरेचयेत्तद्वत्पूरयेच्च पुनः पुनः।
यथैव लोहकारेण भस्त्रा वेगेन चाल्यते ॥
(ह.यो.प्र. 2/62)

भस्त्रै व लिहकाराणां यथाक्रमेण संभ्रमेत।
तथा वायुं च नासाभ्यामुभाभ्यां चालयेच्छनैः ॥
(घे.स. 5/75)

Procedure

1. Sit on Padmasana. Keep the body, neck and head erect. Close the mouth. Next, inhale and exhale quickly ten times like the bellows of the blacksmith. Constantly dilate and contract.
2. When you practise this Pranayama a hissing sound is produced. The practitioner should start with rapid expulsions of breath following one another in rapid succession.
3. When the required number of expulsions, say ten for a round, is finished, the final expulsion is followed by a deepest possible inhalation.
4. The breath is suspended as long as it could be done with comfort.
5. Then deepest possible exhalation is done very slowly. The end of this deep exhalation completes one round of Bhastrika.
6. Rest a while after one round is over by taking a few normal breaths. This will give you relief and make you fit for starting the second round.
7. Do three rounds daily in the morning. You can do another three rounds in the evening also. Busy people who find it difficult to do three rounds of Bhastrika can do one round at least. This also will keep them quite fit.

Bhastrika is a powerful exercise. A combination

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of Kapalabhati and Ujjayi makes up Bhastrika. Practise Kapalabhati and Ujjayi to start with. Then you will find it very easy to do Bhastrika.

Benefits

न च रोगो न च क्लेश आरोग्यं च दिने दिने ।
(घे.स. 5/77)

विधिवत्कुंभक कत्वा रेचयेदिदयानिलम ।
वातपित्तश्लेष्महरं शरिरग्निविवर्धनम ॥
(ह.यो.प्र. 2/65)

1. Bhastrika relieves inflammation of the throat, increases gastric fire, destroys phlegm, removes diseases of the nose and chest and eradicates asthma, consumption, etc.
2. It gives good appetite. It breaks the three Granthis or knots viz. Brahma Granthi, Vishnu Granthi and Rudra Granthi.
3. It destroys phlegm which is the bolt or obstacle to the door at the mouth of Brahma Nadi (Sushumna). It enables one to know the Kundalini.
4. It removes all diseases which arise from excess of wind, bile and phlegm.
5. It gives warmth to the body. When you have no sufficient warm clothing in a cool region to protect yourself from cold, practise this Pranayama and you will get sufficient warmth in the body quickly.
6. It purifies the Nadis considerably. It is the most beneficial of all Kumbhakas. Bhastrika Kumbhaka should be specially practised as it enables the Prana to break through the three Granthis or knots that are firmly located in the Sushumna.
7. It awakens the Kundalini quickly. The practitioner will never suffer from any disease. He will always be healthy.

6. Bhramari Pranayama

वेगाद्घोषं पूरकं भृंगनादं भृंगीनादं रेचेकं मंदमंदम ।
योगीद्राणामेवमभ्यासयोगाच्चित्ते जाता काचिदानंदलिला ॥
(ह.यो.प्र. 2/68)

अर्धरात्रे गते योगी जन्तूनां शब्दवर्जिते ।
कर्णौ पिधाय हस्ताभ्यां कुर्यात पूरककुम्भकम ।
(घे.स. 5/78)

Procedure

1. Sit on Padmasana or Siddhasana.
2. Inhale rapidly through both nostrils making sound of Bhramara, the bee, and exhale rapidly through both nostrils, making the humming sound.
3. You can carry the process till the body is bathed in perspiration.
4. In the end inhale through both nostrils, retain the breath as long as you can do it comfortably and then exhale slowly through both nostrils.
5. The joy which the practitioner gets in making the Kumbhaka is unlimited and indescribable.

Benefits

1. In the beginning, heat of the body is increased as the circulation of blood is quickened.
2. In the end the body-heat is decreased by perspiration. By success in this Bhramari Kumbhaka the Yogic student gets success in Samadhi.

7. Murccha Pranayama

पूरकांते गाढतरं बध्वाजालंधरंशनैः ।
रेचयेन्मूर्छनाख्येयं मनोमूर्छा सुखप्रदा ॥
(ह.यो.प्र. 2/69)

सुखेन कुम्भकं कृत्वा मनस्य भ्रु वारेन्तरम ।
संत्यज्य विषयान सर्वान मनोमूर्च्छां सुखप्रदा ॥
आत्मनि मनसो योगादानन्दो जायते ध्रुवम ॥
(घे.स. 5/83)

Procedure

1. Sit in your Asana and inhale.
2. Retain the breath.
3. Do Jalandhara Bandha by pressing the chin against the chest.
4. Retain the breath till you expect fainting and then exhale slowly.

Benefits

This is Murchha Kumbhaka as it makes the

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mind senseless and gives happiness. But this is not suitable for many.

8. Plavini Pranayama

अंतः प्रवर्तितोदारमारुतापूरितोदरः ।
पयस्यगाधेऽपिसुखात्प्लवते पद्मपत्रवत ॥
(ह.यो.प्र. 2/70)

Procedure

1. Practice of this Pranayama demands skill on the part of the student.
2. He who practises this Plavini can do Jalastambha (solidification of water) and float on water for any length of time. Mr. 'S' a Yogi can float on water for twelve hours at a stretch. He who practises this Plavini Kumbhaka can live on air and dispense with food for some days.
3. The Yogi actually drinks air like water slowly and sends it to the stomach. The stomach gets bloated a bit.
4. If you tap the stomach when it is filled with air, you will get a peculiar tympanic (air) sound. Gradual practice is necessary.
5. The help of one who is well versed in this Pranayama is also necessary. The Yogi can expel all the air from the stomach by gradual belching.

Shatkarma

These are six cleaning practices advised by great Yogis to purify the internal body from impurities similar to Panchakarma as described in Ayurveda. Gheranda Muni explains that the Jeeva moves from one body to another body like a Ghatiyantra that moves up and down by the bullocks. The bodies are produces as per their previous bodies' Karma. Thus when a person wants to get Yogik knowledge he should make his body strong.

आमकुम्भमिवाम्भस्थो जीर्यमाणः सदा घटः ।
योगानलेन सन्दह्य घतशुद्धिम् समाचरेत् ॥
(घे.स. 1/8)

The body is like unbaked earthen pot is filled with water; it soon dissolves and is decayed. On the other hand, if pot is properly baked, the water stays in it and the pot is also safe. In the same manner the body of human body of a human being deteriorates day by day. To make it strong and pure, one should bake it hard in the fire of physical training, i.e. regular practice of Yoga.

सप्तसाधन–
शोधनम् दृढता चैव स्थैर्यम् धैर्यञ्च लाघवम् ।
प्रत्यक्षञ्च निर्लिप्तञ्च घटस्य सप्तसाधनम् ॥
(घे.स. 1/9)

The Seven exercises to train and strengthen the body. These are Shodhana (purifying), Druthata (strengthening), Sthairya (steadying), Dhairya (calming), Laghava (lightness), Pratyaksha (perception) and Nirlipta (isolation).

मेदः श्लेष्माधिकः पूर्वं षटकर्माणि समाचरेत ।
अन्यस्तु नाचरेत्तानि दोषाणां समभावतः ॥
(ह.यो.प्र. 2/21)

Person having excess of Shleshma and Medas should practice Shatkarma otherwise it is not necessary as Doshas are in equilibrium.

षटकर्मणा शोधनञ्च आसनेन भवेद्दृढम ।
मुद्रया स्थिरता चैव प्रत्याहारेण धीरता ॥
प्राणायामाल्लाघवञ्च ध्यानात्प्रत्यक्षमात्मनि ।
समाधिना निर्लिप्तञ्च न संशयः ॥
(घे.स. 1/10-11)

1. The purification is acquired by the regular performance of six practices (Shata Karma) to be mentioned.
2. Asana or posture gives Driddhata or strength.
3. Mudra gives Sthirata or steadiness
4. Pratyahara gives Dhairyata or calmness.
5. Pranayama gives lightness or Laghima
6. Dhyana gives perception
7. Samadhi gives isolation (Nirliptata), which is verily the freedom.

The Shodhana is done by six karmas. Hatha Yoga Pradipika explains Six Karmas are the cleansing procedures done before Pranayama this helps to remove the Meda and Kapha in the two Nadis; Ida and Pingala Nadi and thus allows free

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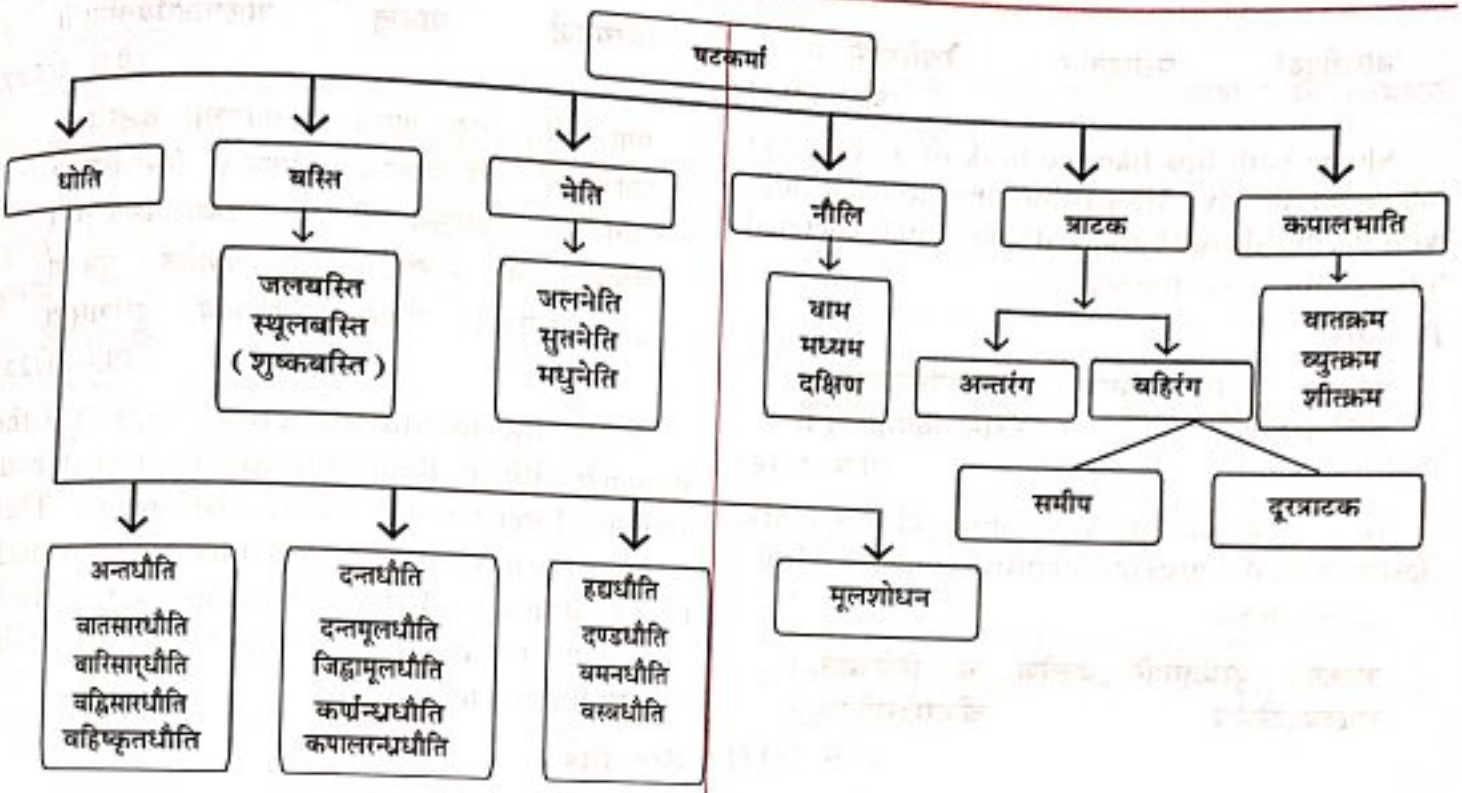

passage of Prana Vata through Sushumna Nadi.

मलाकुलासु नाडीषु मारुतो नैव मद्ध्यगः।
कथम् स्यादुन्मनीभावः कार्यसिद्धिः कथम् भवेत्॥
(ह.यो.प्र. 2/4)

When the Naadis are full of impurities,the breath does not go into the middle Nadi Sushumna.

शुद्धिमेति यदा सर्वम् नादिचक्र महाकुलम्।
तदैव जायते योगी प्राणसम्ग्रहणे क्षमः॥
(ह.यो.प्र. 2/5)

When all the Nadis is full of impurities, is cleaned, then the Yogi becomes able to control the Prana and perform Pranayama.

षटकर्माः
धौति र्वस्तिस्तथा नेतिर्लौलिकी त्राटकं तथा।
कपालभतिश्चेतानि षट्कर्माणि समाचरेत्।
(घे.स. 1/12)

धौतिर्वस्तिस्तथा नेति त्राटकं नौलिकं तथा।
कपालभातिश्चेतानि षट्कर्माणि प्रचक्षते।
(ह.यो.प्र. 2/22)

कर्मषट्कमिदं गोप्यं घटशोधनकारकं विचत्रगुणसन्धादि पूज्यते योगिपुनावैः॥ (ह.यो.प्र. 2/22)

The Six procedures are :

1. Dhouthi
2. Basti
3. Neti
4. Louliki/Nouli
5. Trataka
6. Kapalabhati

1. Dhouti

There are 4 types of Dhouti :

अन्तधौति दन्तधौति हृंध्दौतिमूलशोधनम।
धौति चतुर्विधा कृत्वा घटं कुर्वन्तु निर्मलम॥
(घे.स. 1/3)

The Dhouti of four kinds help in clearing the impurities of the body. They are Antardhouti, Dantadhouti, Hrudyadhouti and Mulashodhana.

1. अन्तर्धौति - It is subdivided into 4 types

वातसारं वारिसारं वन्हिसारं बहिष्कृतम।
घटस्य निर्म्मलार्थाय अन्तर्धौतिश्चतुविधा॥
(घे.स. 1/14)

1. वातसार धौति 2. वारिसार् धौति 3. वहिसार धौति 4. बहिष्कृत धौति।

2. दन्तधौति– 1. दन्तमूल धौति 2. जिह्वामूल धौति 3. कर्णान्ध्र धौति 4. कपालरन्ध्र धौति

3. हृत्धौति– 1. दण्ड धौति 2. वमन धौति 3. वस्त्र धौति

4. मूल शोधन

वातसार धौति–

काकचन्चुवदास्येन पिबेत्वायुं शनैः भक्षयेत्

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चालयेदुदरं पश्चाद्वर्त्मना रेचयेच्छनैः ॥
(घे.स. 1/15)

Shape both lips like the beak of a crow and inhale air slowly. After filling the stomach fully with air, this should be moved slowly and execrated through the lower passage.

Benefits

वातसारं परं गोप्यं देहनिर्म्मलकारणम ।
सर्वरोगक्षयकरं देहानलविवर्द्धकम् ॥
(घे.स. 1/16)

It is a secrete process, which cleans body, destroys all diseases and improves digestive fire.

वारिसारधौति–

आकण्ठं पूरयेत्वारि वक्त्रेण च पिवेच्छनैः ।
चालयेदुदरेणैव चोदराद्रेचयेदधः ।
(घे.स. 1/17)

Water is filled in the mouth up to throat and this is drunk slowly. This moves to the stomach and should be expelled through rectum.

Benefits

वारिसारं परं गोप्यं देहनिर्म्मलकारकम् ।
साधयेतत्प्रयत्नेन देवदेहं प्रपद्यते ॥

One who practices Varisara cleans the body. By practicing it carefully, one gets shining body.

वह्निसारधौति–

नाभिग्रन्थिं मेरुपृष्ठे शतवारञ्च कारयेत् ।
अग्निसारमेषा धौतियोगिनां योगसिद्धिदा ॥
(घे.स. 1/19)

Press the naval region or intestines towards the spine for hundred times. This Agnisara process gives success in the practice of Yoga.

Benefits

उदरामयजंत्यक्त्वा जठराग्नि विवर्धयेत ।
एषा धौतिः परा गोप्या देवानामपि दुर्लभा ॥
(घे.स. 1/20)

It cures all the diseases of abdomen and enhances Agni.

वहिष्कृतधौति–

काकीमुद्रां साधयित्वा पूरयेदुदरं मारुत ।
धारयेदर्द्ध यामन्तु चालयेदर्धवर्त्मना ॥
(घे.स. 1/22)

एषा धौतिः परा गोप्या न प्रकाश्या कदाचन ।
नाभिमग्नो जले स्थित्वा शक्तिनाडीं विसर्जयेत् ॥
कराभ्यां क्षालयेन्नाडीं यावन्मलविसर्जनम् ।
तावत्प्रक्षाल्य नाडीञ्च उदरे वेशयेत् पुनः ॥
इदं प्रक्षालनं गोप्यं देवानामपि दुर्लभम् ॥
(घे.स. 1/23)

Make the mouth like crows beak, fill the stomach with air. Retain this for one and half hour and then force it down towards the intestine. Then stand in the naval deep water, draw out Shaktinadi i.e. intestines, wash it with hand and draw it inside again, this not possible till one can with hold his breath for one hour.

Benefits

केवलं धौतिमात्रेण देवदेहो भवेद्ध्रुवम् । (घे.स. 1/24)

By the practice of this Dhouti only one attains the body like that of Gods.

यामार्धं धारणां शक्तिं यावन्न साधयेन्नरः ।
बहिष्कृतं महद्धौतिस्तावच्चैव न जायते ।
(घे.स. 1/25)

A Yogi should not practice this great Dhouti as long as he does not achieve the capacity to retain breath in his stomach for one and half hours.

चतुरंगुलविस्तारं हस्तपञ्चदशायतम ।
गुरुपदिष्टमर्गेन सिक्तं वस्त्रं सनैर्ग्रसेत ॥
पुनः प्रत्याहरेश्चैतदुदितं धौतिकर्म तत ॥
(ह.यो.प्र. 2/24)

Take a clean cloth of 4 fingers broad and fifteen spans long and slowly swallow it according to the instructions of Guru.

दन्तधौति-दन्तमूलं जिह्वामूलं रन्धञ्च कर्णयुग्मयोः ।
कपालरन्ध्रं पञ्चैते दन्तधौतिं विधीयते ।
(घे.स. 1/26)

Five types of Danta Dhouti.

1. Danta Mula Dhouti
2. Jivha Mula Dhouti
3. Karna Randhra Right Dhouti
4. Karna Randhra Left Dhouti

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5. Kapalarandhra Dhouti

दन्तमूलधौति–

खादिरेण रसेनाथ मृत्तिकया च शुद्धया।
मार्जयेद्दन्तमूलञ्च यावत्किल्विषमहरेत ॥
(घे.स. 1/27)

One should rub teeth with Khadira Choorna or pure earth till the dental impurities are removed.

Benefits-

दन्तमूलं परा धौतियोगिनां योगसाधने।
नित्यं कुर्यात्प्रभाते च दन्तरक्षां च योगवित।
दन्तमूलं धावनादिकार्येषु योगिनां मतम ॥
(घे.स. 1/28)

Thsi teeth washing is great Dhauti and an important in the practice of Yoga for the Yogis. it should be done daily morning by the Yogis, in order to preserve teeth.

जिह्वामूलधौति–

अथातः संम्प्रवक्ष्यामि जिह्वाशोधनकारणम्।
जरामरणरोगादीन्नाशयेद्दीर्घलम्बिका ॥
तर्जनीमध्यमानामा अन्गुलित्रययोगतः।
वेशयेदगलमध्ये तु मार्जयेल्लम्बिका मूलम ॥
शनैः शनैमार्जयित्वा कफदोषं निवारयेत ॥
(घे.स. 1/29-30)

Index finger, middle finger and ring finger are joined together and used to clean the root of the tongue. Tongue should be rubbed with better pulled out little worth metal instrument every day. So that tongue gets elongated gradually.

कर्णरन्ध्रधौति–

तर्जन्यनामिकायोगान्मार्जयेत् कर्णरन्ध्रयोः।
नित्यमभ्यासयोगेन नादान्तरं प्रकाशयेत् ॥
(घे.स. 1/33)

Clean the ear every day with the help of index and ring finger. By practicing this one can hear mystic sounds.

कपालरन्ध्रधौति–

ब्रुद्धाडगुष्ठेन दक्षेण मार्जयेभ्दालरन्ध्रकं।
एवमभ्यासयोगेन कफदोषं निवारयेत् ॥
(घे.स. 1/34)

Depression in the fore head near the nasal bridge is pressed with thumb of right hand. By the practice of this Kapha Roga gets subsided.

Benefits-

नाडी निर्मलतां याति दिव्यदृष्टिः प्रजायते निद्रन्ते भोजनान्ते च दिवान्ते च दिने दिने ॥ (घे.स. 1/34)

If one practices daily after getting up from sleep, after meals, evening, he will be endowed with extra ordinary vision.

हृत्धौति–It is of three types, Danda Dhouti, Vamana Dhouti and Vastra Dhouti

हृत्धौतिं त्रिविधां कुर्याद्दण्डवमनवाससा।
(घे.स. 1/36)

दण्डधौति–रम्भादण्डं हरिद्दंडं वेत्रदण्डं तथैव च।
हन्मध्ये चालयित्वा तु पुनः प्रत्याहरेच्छनैः ॥
(घे.स. 1/37)

Take the stalk of Banana, turmeric or cane. Put it into the oesophagus slowly and with draw it out slowly.

Benefits

कफपित्तं तथा क्लेदं रेचयेदूर्ध्ववर्त्मना।
दण्डधौतिविधानेन हृद्रोगं नाशयेदध्रुवम्।
(घे.स. 1/38)

By this process Kapha, Pitta, Kleda are expelled out and cure all kinds of heart diseases surly.

वामनधौति–

भोजनान्ते पिबेत्वारि चाकण्ठपूरितं सुधीः।
ऊर्ध्वं दृष्टिं क्षणं कृत्वा तज्जलं वमयेत्पुनः ॥
(घे.स. 1/39)

After meals one should drink water up to the throat, then look upwards for a while and vomit it out.

Benefits

नित्यमभ्यासयोगेन कफपित्तं निवारयेत ॥
(घे.स. 1/39)

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Practice of this every day cures diseases of Pitta and Kapha.

वस्त्र धौति–

चतुरन्गुलविस्तारं सूक्ष्मवस्त्रं शनैर्ग्रसेत्।
पुनःप्रत्याहरेतत्प्रोच्यते धौतिकर्मकम ॥
(घे.स. 1/40)

Thin cloth of four finger width is slowly swallowed and drawn out slowly after wards. This process in Vastra Dhouti.

Benefits

गुल्मज्वरप्लीहाकुष्ठंकफपित्तं विनश्यति।
आरोग्यं बलपुष्टिश्च भवेत्तस्य दिने दिने ॥
(घे.स. 1/41)

It cures abdominal diseases, Gulma, Jwara, Pleeha, Kushtha and diseases of Kapha and Pita. It Practiced regularly he will be endowed with health, strength and nourishments.

मूलशोधन–

अपानक्रूरता तावद्यावन्मूलं न शोधयेत।
तस्मात्सर्वप्रयत्नेन मूलशोधनमाचरेत् ॥
पित्तमूलस्य दण्डेन मध्यमान्गुलि नापि वा।
यत्नेन क्षालयेद्गुह्यं वारिणा च पुनः पुनः ॥
(घे.स.1/42-43)

By the stalk of turmeric or middle finger, the rectum should be cleaned well with water again and again.

Benefits

वारयेत्कोष्ठकाठिन्यमामजीर्णं निवारयेत्। कारणं कान्तिपुष्टयोश्च वह्निमण्डलम् दिपनम ॥ (घे.स. 1/44)

Cures the constipation and indigestion, enhances lustre, nourishment and digestive fire.

2. वस्ति–

जलवस्तिः शुष्कवस्ति र्वस्तिः स्यादद्विविधा स्मृता।
जलवस्तिं जले कुर्याच्छुष्कवस्तिं सदा क्षितौ ॥
(घे.स. 1/45)

नाभिदन्धजले पायौ न्यस्तनालोत्कटासनः।
आधाराकुंचनं कुर्यात्क्षालनं बस्तिकर्म तत ॥
(ह.यो.प्र. 2/26)

Basti is two types. One is Jala Basti and Shushka Basti.

जलबस्ति–

नाभिदध्नजले पायु न्यस्तवानुत्कटासनः।
आकुन्चनम् प्रसारञ्च जलबस्ति समाचरेत ॥
(घे.स. 1/46)

One should stand in the navel level water, assume Utkatasana position, contract and relax the muscles of anal sphincter. This is Jalabasti.

Benefits

प्रमेहञ्च उदावर्तं क्रूरवायुं निवारयेत।
भवेत्स्वच्छन्ददेहश्च कामदेव समोभवेत ॥
(घे.स. 1/47)

It cures urinary disorder (Prameha), Udavarta (disoreder of Vayu) and constipation. Body becomes beautiful like that of Kamadeva.

शुष्कबस्ति–

बस्तिं पश्चिमोत्तानेन चालयित्वा शनैरधः।
अश्विनीमुद्रया पायुमाकुञ्चयेत् प्रसारयेत् ॥
(घे.स. 1/48)

One should assume the pasture of Pashchimottasana, then perform Ashwini Mudra by contrasting and relaxing anal sphincter.

Benefits

एवमभ्यसयोगेन कोष्ठदोषो न विद्यते।
विवर्धयेत् जठरग्निमामवातम् विनाशयेत् ॥
(घे.स. 1/49)

गुल्मप्लीहोदरं चापि वातपिताकफोभ्दवाः।
बस्ति कर्म प्रबावेन क्षीयंते सकलामयाः ॥
(ह.यो.प्र. 2/27)

Practice of this cures constipation, Gulma, Pliha Roga, enhance Agni and cures Amavata.

3. नेति–

There are 6 types of Neti. Jala Neti, Dugdha Neti, Vyukrama Nati, Sitakarma Neti, Suta Neti, Madhu Neti.

Out of these 6 types Jala Neti and Sutra neti are in practice.

Jala Neti – cleansing with water

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Apparatus- Neti Pot. It is made up of rubber and plastic material having long beak like projection which can be easily placed in nasal passage. This pot contains about 120 ml. Of liquid up to its level marked.

Procedure

- Add a teaspoonful of table salt to pot containing about 500 ml luke warm water.
- Fill the Neti pot its level mark with the water.
- Insert the nozzle of the pot into the right nostril.
- Keep the mouth open to allow free breathing the mouth.
- Tilt the head slightly towards left, so that water from the pot enters the right nostril and easily flows out through the left one by gravity. Allow the flow till the pot is empty.
- Repeat the procedure again.
- Repeat the same procedure twice through the left nostril also.
- Carryout active exhalation alternately through both nostrils so tha there is absolutely no fraction of water.

Benefits

Beneficial for eyes, helpful in Kapha Roga

Madhu Neti is practiced by adding 3-4 drops of honey in place of salt.

Sutra Neti

वितस्तिमां सूक्ष्मसूत्रं नासानाले प्रवेशयेत्।
मुखान्निर्गमयेत् पश्चात प्रोच्यते नेतिकर्मकम्॥
(घे.स. 1/50)

सूत्रं वितस्ति सुस्निग्धं नासानाले प्रवेशयेत्।
मुखन्निर्गम येच्चैषा नेतिः सिद्धै निंगद्यते॥
(ह.यो.प्र. 2/29)

Take a thin thread of 32 Angula insert it through one nostril and take out through mouth, this is Neti Karma.

Benefits

साधनान्नेतिकार्यस्य खेचरीसिद्धिमाप्नुयात्।
कफदोषा विनश्यन्ति ल्व्यदृष्टिः प्रजायते॥
(घे.स. 1/51)

कपालसोधनी चैव दिव्यदृष्टिप्रदायिनी।
जत्रूर्ध्वजातरोगौधं नेतिराशु निहन्ति च॥
(ह.यो.प्र. 2/30)

By practicing Neti Kriya one can obtain Khechari Mudra. It destroys Kapha Dosha and gives clear vision.

4. नौलि-

Nouli is Yogic abdominal process for cleansing of abdominal Viscera.

Nouli is 3 types—

1. Uddiyana Bandha
2. Agnisara Kriya
3. Nouli Proper.

Nouli proper is in practice generally. Nouli proper can be done in three stages

1. Vama Nouli
2. Madhyama Nouli
3. Dakshina Nouli

अमन्दवेगमुत्तुन्दन्चभ्रामयेदुभपार्स्वयोः।
सर्वरोगान्निहन्दीह देहानलविवर्धकम्॥
(घे.स. 1/52)

अमन्दवर्तवेगेन तु द सव्यापसव्यतः।
नतांसो भ्रमयेदेषा नौलिः सिद्धैः प्रचक्षते॥
(ह.यो.प्र. 2/33)

One should move the stomach and intestines from one side to other side. This process is called as Nouli or Loukiki.

Benefits-

मदाग्निसंदीपनपाचनादि संधापिका नंदकरी सदैव।
अवेष दोषामयशोषणी च हठक्रियामौलिरियं च नौलिः।
(ह.यो.प्र. 2/34)

Cures all Variety of diseases and increases body fire. It dies of all the Doshas completely. Digestion

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is improved, constipation is relieved, and abdominal fat is reduced.

5. त्राटक–

निमेषोन्मेषकं त्यक्त्वा सूक्ष्मलक्ष्यं निरीक्षयेत।
यावदश्रुन पतति त्राटकं प्रोच्यते बुधैः॥
(घे.स. 1/53)

निरीक्षेन्निश्चलदृशा सूक्ष्मलक्ष्यं समाहितः।
अश्रु संपात पर्यन्त माचार्यैस्त्राटकं स्मृतम्॥
(ह.यो.प्र. 2/31)

One should continue look at some small object till eyes tear. This is called Trataka.

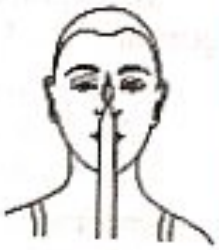
Benefits-

एवमभ्यसयोगेन शाम्भवी जायते ध्रुवम्।
नेत्ररोगा विनश्यन्ति दिव्यदृष्टिः प्रजायते॥
(घे.स. 1/54)

मोचनं नेत्ररोगाणां तन्त्रादीनां कपाटकम्।
यत्नतन्त्राटकं गोप्यं यथा हाटकपेटकम्॥
(ह.यो.प 2/32)

By practicing this technique, one can attain Shambhavi Siddhi very fast. It destroys all eye diseases and gives good vision.

Procedure



1. Sit in any meditative posture
2. Place the burning candle with flame at the same height as the eyes at a distance of about one meter.
3. Start gazing at the flame without blinking of the eyes.
4. Learn to ignore the irritation and watering of the eye
5. With the practice, gaze becomes steady makes the mind single pointed relaxation of the eye is important otherwise strain of the eyes muscles may cause headache.
6. Progress slowly starting with 10 seconds and increasing the duration by 10 second per week.
7. At the end wash the eyes thoroughly with clean water.

Benefits

1. Best mental concatenation power is achieved.
2. Will power is strengthened.
3. Prolonged practice of Trataka helps in attaining
4. Tear glands activated.
5. Eye sight is improved.

6. कपालभाति–

In Kaphalabhati, the exhalation sounds like that of the bellow of the black smith. Hence the particular name Kapalabhati is given to this cleansing process.

वामक्रमेणव्युत्क्रमेण शीत्क्रमेण विशेषतः।
भालभातिं त्रिधा कुर्यात् कफदोषं निवारयेत्॥
(घे.स. 1/55)

Kapalabhati is of three types, namely Vamakrama, Vyutkrama and Sheetakrama. They destroy Kapha Dosha.

भस्त्रवल्लोहकारस्य रेचपूरौ ससभ्रमो।
कपालभाति र्विख्याता कफदोष विशोषणः॥
(ह.यो.प्र. 2/35)

As the black smith blows his bellow in the same way one should inhale and exhale very fast. This is Kapalabhati and it dries of Kapha Dosha.

वामक्रम कपालभाति–

ईडया पूरयेद्वायु रेचयेत् पिन्गला पुनः।
पिन्गलया पूरयित्वा पुनश्चन्द्रेण रेचयेत्॥
(घे.स. 1/66)

पूरकं रेचकं कृत्वा वेगेन न तु चालयेत।
एवमभ्यासयोगेन कफदोषं निवारयेत्॥
(घे.स. 1/66)

Inhale through the left nostril and exhale through right nostril then inhale through right nostril and exhale through left nostril.

Benefits

The inspiration and expiration should be without force which destroys Kapha.

व्युत्क्रम कपालभाति–

नासाभ्यां जलमाकृष्य पुनर्वक्त्रेण रेचयेत्।
पायं पायं व्युत्क्रमेण श्लेष्मदोषम्निवारयेत्॥
(घे.स. 1/58)

Draw water through both nostrils and expel through mouth slowly. This process is Vyutkrama Kapalabhati. This destroys Kapha Dosha.

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शीत्क्रम कपालभाति–

शीत्कृत्य पीत्वा वक्त्रेण नासानालौर्विरेचयेत।
एवमभ्यासयोगेन कामदेव समो भवेत्॥
(घे.स. 1/59)

Drink water through mouth and expel it through nostrils to get a beautiful body like that of Kamadeva.

Benefits of Shatkarma

न जायते वार्द्धक्यं च जरा नैव प्रजायते।
भवेत्स्वच्छन्ददेहश्च कफदोषं निवारयेत्॥
(घे.स. 1/69)

षट्कर्म निर्गतस्थौल्य कफदोषमलाधिकः।
प्राणायामं ततः कुर्यादनायासेन सिद्ध्यति॥
(ह.यो.प्र. 2/36)

This prevents old age and diseases. The body becomes healthy elastic and free from Kapha disorders.

Bandhas and Mudras

Bandhas

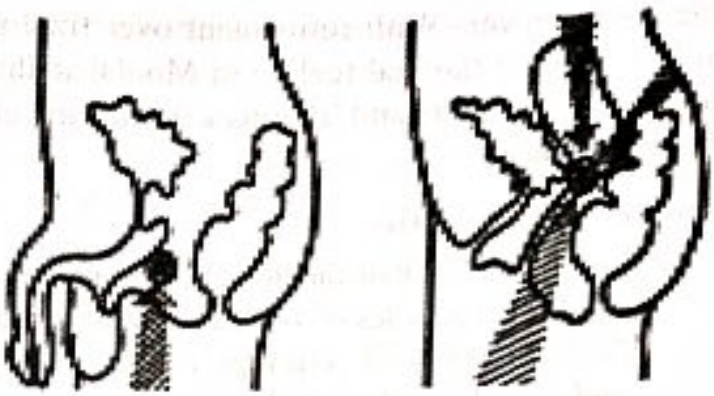
There are three classic Bandhas; Mula, Uddiyana, and Jalandhara Bandha. When practiced together they are called Tri-Bandha. Jalandhara Bandha, Uddiyana Bandha and Moolabandha are situated respectively, in the throat, abdomen and perineum. They are practiced together or individually at specific times during Kriya, Asana, Pranayama, Mudra, visualization and meditation practice.

The word Bandha, may be defined in several ways 'binding, tying a bond, tie, chain, fetter, to catch, to hold captive, arrest, imprison, fix, fasten, hold back, restrain, stop, shut, close, redirect, check, obstruct, clot and lock.'

It denotes positions which close the body apertures and where the fingers are held, together with special hand features.

Moola Bandha

पार्ष्णिभागेन सम्पीड्य योनिमाकुंचयेदगुदम।
अपानमूर्ध्वमाकृष्य मूलबन्धोऽभिधीयते॥
(ह.यो.प्र. 2/60)



अधोगतिमपानं वा ऊर्ध्वगं कुरुते बलात।
आकुचनेन तं प्राहुर्मूलबधं हि योगिनः॥
(ह.यो.प्र. 3/61)

The Sanskrit word moola means 'root' and the word Bandha means 'lock'. Here the word Moola means various things, it refers to the Mooladhara Chakra, the seat of the Kundalini and it also refers to the root of the trunk of the body, the perineum. In English, Moolabandha can be translated by the cumbersome name 'the perineum contraction lock'.

Place of contraction

The area to be contracted is the physical trigger point of the Mooladhara Chakra. This has a slightly different location in men and women.

For males: in the perineum, between the anus and the sexual organ.

For females: at the cervix, where the vagina and the uterus meet.

Moolabandha is often done incorrectly by contraction of the anus. Try to find the exact location that we have described and apply the contraction at that point during Moolabandha. Sitting position- The best Asanas for Moolabandha are Siddhasana for men and Siddha yoni asana for women. While sitting in either of these Asanas, one heel applies firm pressure in the region of the Mooladhara chakra, which improves the physical contraction.The three main Hatha yoga treatises – Hatha Yoga Pradipika, Siva Samhita and the Gheranda Samhita – all praise Moolabandha and describe it as drawing up on the anus.

This is only a general description of the

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practice however. With refinement over time a student will get the real feeling of Moolabandha and be able to isolate and lift only certain parts of the pelvic floor.

Mula Bandha practice

1. Lie on your back on the floor, bend your knees and bring the soles of your feet to rest on the floor either side of your hips. Breathe slowly and deeply and feel the air inflate your abdomen when you inhale and the navel fall towards the floor as the abdomen descends as you exhale.
2. Take a long inhale and a long exhale and relax your butt cheeks and feel the contact between your body and the ground.
3. Take another long inhale and exhale as deeply as you can. At the end of the exhale hold your breath for a split second and contract your pelvic floor muscles. Imagine you are urinating and you want to stop mid-flow. You should feel your genitals and your anus move up into your body. Inhale. You should feel that the deep abdominal muscles between the top of your genital and below your navel contract and move in and up slightly.
4. Inhale deeply and slowly, feeling that, due to the contraction of the abdominals, the breath now moves into the rib cage. You should feel that the intercostals muscles between each rib stretch and expand and that the ribs move outwards and upwards.
5. Exhale from the ribs as deeply and slowly as possible. Both the inhale and the exhale should be controlled and smooth. Learning to control the movement of the breath is one of the biggest challenges in yoga generally and is especially important when performing the Ashtanga asana series.
6. When the exhale finishes pause, contract the pelvic floor again, and inhale and exhale slowly, trying to keep the contraction all of the time. Repeat step 6 five times.
7. After five long inhales and exhales holding the Bandha, exhale, release the pelvic floor and inhale and exhale with no Bandha feeling the abdomen expand and contract.
8. After the exhale, pause, contract the pelvic floor and try to keep the contraction for five breaths, tightening it after each exhale.
9. Release and breathe normally. Feel the difference in the quality of the breath and in how your body moves as you inhale and exhale.

Benefits

Strengthens the pelvic floor, relieves hemorrhoids and congestion in the pelvic area. Calms the autonomic nervous system, calms and relaxes the mind. On the spiritual level, Moolabandha activates and purifies the Mooladhara Chakra. It awakens dormant consciousness and the Kundalini Shakti.

Jalandhara Bandha - Chin Lock

कंठमाकुच्य हृद्धे स्थापयेच्छिचुकं दृढम।
बन्धो जालधारख्योऽयं जरमृत्युविनाशकः॥
बन्धोति हि शिराजालमधोगामि नभोजलम।
ततो जालंधरो बन्धं कंठदुःखोघनाशनः॥

(ह.यो.प्र. 3/69,70)

Starting Position: Meditation Pose
Concentration: on the Vishuddhi Chakra
Breath: inhale deeply and hold the breath
Repetitions: 3–5 rounds

Practice: Inhale deeply and hold the breath. Place the hands on the knees, lift the shoulders and tilt the body forward slightly, keeping the back straight. Press the chin firmly against the chest or between the collarbones so that the windpipe and oesophagus are firmly closed. Concentrate on the Vishuddhi Chakra and hold the breath for as long as comfortable. Raise the head and with a long exhalation return to the starting position. Breathing normally remains in this position for some time.

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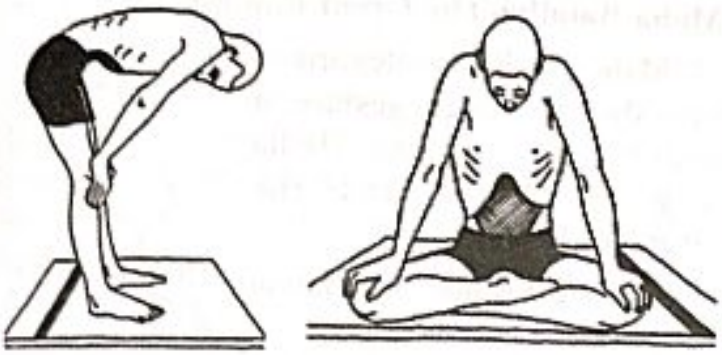
Benefits: This exercise awakens the inner energy centers, especially the Vishuddhi Chakra. Improves the ability to retain the breath for a long period of time and develops the ability to concentrate. Beneficial for throat diseases and regulates thyroid function.

Contraindication- Cervical spondylosis, Vertigo, Hypertension, COPD.

Uddiyana Bandha



बद्धो येन सुषुम्नायां प्राणस्तूड्डीयते यतः।
तस्मादुड्डीयनाख्योऽयं योगिभिः समुदाहृतः॥
उड्डीनं कुरुते यस्मादविश्रातं महाखगः।
उड्डीयानं तदेव स्यात्तत्र बंधोऽभिधीयते॥
उदरे पश्चिमं तानं नाभ्रूर्ध्वं च कारयेत।
उड्डीयानो ह्यसौ बंधो मृत्युमातंगकेसरी॥

(ह.यो.प्र. 3/54-56)

Starting Position: Meditation Pose or Standing

Concentration: on the Manipura Chakra

Breath: completely exhale and hold the breath out

Repetitions: 3–5 rounds

Practice: Completely exhale and hold the breath out. Place the hands on the knees, raise the shoulders and tilt the body forward slightly, keeping the back straight. (To practice this Bandha standing, separate the legs a little and bend the knees slightly.) Concentrate on the Manipura Chakra, pull the abdominal muscles in and up into the abdominal cavity as far as possible. Hold the position as long as comfortable. Release the muscular tension and return to the starting position with a deep inhalation. Breathing normally remains for some time in this position.

Benefits: Activates the Manipura Chakra and solar plexus. Stimulates intestinal activity and helps relieve constipation. Stimulates the pancreas and is helpful for diabetes. Strengthens the immune system. Balances the mind, soothes irritability and anger and dispels a depressive mood.

Contraindication- Colitis, Peptic and intestinal ulcer, Diaphragmatic hernis, Hypertension, Glaucoma, Pregenant woman, Mentruation

Mudra

Mudra is a term with many meanings. It is used to signify a gesture, a mystic position of the hands, a seal, or even a symbol. There are eye positions, body postures, and breathing techniques that are called Mudras. These symbolic finger, eye, and body postures can vividly depict certain states or processes of consciousness. Practicing the different types of Mudras for health is considered good as it provides physical, mental, as well as spiritual benefits. Mudras, also known as hand yoga, typically involves placing the hands and fingers in certain positions as described in the Vedas.

तस्मादत्सर्वप्रयत्नेन प्रबोधयितुमीश्वरीम।
ब्रह्मव्दारमुखे सुप्तां मुद्रभ्यासं समाचरेत॥

(ह.यो.प्र. 3/5)

Therefore the goddess sleeping at the entrance of Brahma's door should be constantly aroused with all effort, by performing Mudra thoroughly.

महामुद्रा महाबन्धो महावेधश्च खेचरी।
उड्डीयानं मूलबन्धश्च बन्धो जालन्धराभिधः॥
करणी विपरीताख्या वाज्रोली रिक्तचालनम।
इदं हि मुद्रादशकं जरामरण नाशनम॥

(ह.यो.प्र. 3/6)

Mudra and Bandha have been mentioned in Yoga for the attainment of eight Ashraya along with Asthanga Yoga. Mahamudra, Mahabandha, Mahavedha, Khechari, Uddiyanam, Mulabandha, Jalandhara, Vipatita Karani, Vajroli, Shaktichalana aree ten important Mudra.

According to Gheranda Samhita- 25 Mudras

Mahamudra, Nabhobandha, Khecari, Uddiyanam, Mulabandha, Jalandhara, Mahabandha, viparita Karani, Vajroli, Shakti

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Chalana, Tadagi, Manduki, Sambhavi, Panchadha, Ashwini, Pashini, Kaki, Matangi, Bhujagani, Mahavedha.

Five groups of yoga Mudras

The yoga Mudras can be categorised into approximately five groups which are described as follows:

1. Hasta, hand Mudras: The hand Mudras presented in this book are meditative Mudras. They redirect the Prana being emitted by the hands back into the body. Mudras which join the thumb and index finger engage the motor cortex at a very subtle level, generating a loop of energy which moves from the brain down the hand and then back again. Conscious awareness of this process rapidly leads to internalisation. Techniques included in this category:

1. Jnana Mudra
2. Chin Mudra
3. Yoni Mudra
4. Bhairava Mudra
5. Hridaya Mudra.

2. Mana, head Mudras: These practices form an integral part of Kundalini yoga and many are meditation techniques in their own right. They utilise the eyes, ears, nose, tongue and lips. Techniques included in this category:

1. Shambhavi Mudra
2. Nasikagra drishti
3. Khechari Mudra
4. Kaki Mudra
5. Bhujangini Mudra
6. Bhoochari Mudra
7. Akashi Mudra
8. Shanmukhi Mudra
9. Unmani Mudra.

3. Kaya, postural Mudras: These practices utilise physical postures combined with breathing and concentration. Techniques included in this category:

1. Prana Mudra
2. Vipareeta karani Mudra
3. Yoga Mudra
4. Pashinee Mudra
5. Manduki Mudra
6. Tadagi Mudra.

4. Bandha, lock Mudras: These practices combine Mudra and Bandha. They charge the system with Prana and prepare it for Kundalini awakening. Techniques included in this category:

1. Maha Mudra
2. Maha Bheda Mudra
3. Maha Vedha Mudra.

5. Adhara, perineal Mudras: These techniques redirect Prana from the lower centres to the brain. Mudras concerned with sublimating sexual energy are in this group. Techniques included in this category:

1. Ashwini Mudra
2. Vajroli/Sahajoli Mudra.

Maha Bandha-The Great Bandha

Maha Bandha is categorized as a Mudra or yogic gesture in both the classical texts Hatha Yoga Pradipika and the Gheranda Samhita.

Starting Position: Meditation Pose

Concentration: on the Mooladhara, Manipura and Vishuddhi Chakras.

Breath: exhale completely and hold the breath.

Repetitions: 3–5 rounds

Practice : Inhale deeply and exhale fully through the mouth. Hold the breath out. Place the hands on the knees, raise the shoulders and tilt the upper body forward slightly, keeping the back straight. Perform Jalandhara Bandha and concentrate on the Vishuddhi Chakra. Perform Uddiyana Bandha and concentrate on the Manipura Chakra. Finally, come into Mulabandha and concentrate on the Muladhara Chakra. Remain in this position, with all three Bandhas maintained, for as long as the breath can easily be held. Release the Bandhas in the same sequence as they were applied. Inhale deeply and return to the starting position. Breathing normally remains for some time in this position.

Benefits: Beneficial for the health of the whole body, especially the autonomic nervous system, internal organs, muscles and nerves. Has a positive influence upon the mind. It removes stomach disorders.

Different Types of Yoga Mudras

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The different types of Yoga Mudra aid a person

to achieve better health and mental condition through proper and regular practice. Yoga Mudra is a gesture, often done with hands, to symbolise a closing up or a seal. Yogic Mudras are weapons to use the energy in a better manner in a specific direction. Yoga Mudra has a tremendous effect on posture and thought process. It is an easy process of exhaling and inhaling and can be done sitting in Easy Pose or Sukasana, which is a comfortable cross legged sitting posture.

Kechari Mudra (The Tongue Lock)

Kechari Mudra is considered the king among Mudras. In Sanskrit, the word 'Kha' indicates Brahman or the supreme reality and 'Chara' means to move. Kechari Mudra helps the practitioner to move in the blissful infinite consciousness of Brahman. Kechari is an advanced practice that enables the yogi to reach higher states of consciousness. Kechari Mudra is mentioned in Gheranda Samhita, Hatha Yoga Pradipika and various other yogic and tantric texts.

Kechari Mudra is a yoga practice where the tongue is rolled up to touch the soft palate. This is an advanced practice and the yogi is said to overcome thirst, hunger, decay and death by this practice.

Method

1. Sit in a comfortable position. Close the mouth and roll the tongue up to touch the upper palate. See how far back it can go. Initially it may touch the hard palate. Some may be able to touch the soft palate with the first try itself. Keep the tongue there for as long as comfortable. Initially one may be able to keep it for less than a minute.
2. The above process should be continued and one will be able to hold the tongue on the palate for a prolonged duration.
3. With practice, the tongue will be able to go further back. Some day it will touch the uvula at the back of the throat. With further practice, the tongue will be able to negotiate the uvula and go behind it.
4. Next the tongue enters the nasal cavity. One should be able to hold it there for at least few minutes. One can breathe normally during this process. As you progress, the breathing rate will go down to 5 – 8 breaths per minute or even lower.
5. Once inside the nasal cavity, the tongue can stimulate certain nerve centers that are connected to the brain. It is said that constant churning of the tongue produces a liquid that emanates from the roof of the cavity.

Benefits of Kechari Mudra (The Tongue Lock)

1. Gheranda Samhita says that by performing Kechari Mudra, the yogi overcomes fainting, laziness, thirst and hunger.
2. The yogi doesn't suffer from disease, decay and death. The immune system becomes very strong. The body becomes divine.
3. In the Gheranda Samhitaas well as in the Hatha Yoga Pradipika, it is said that such a yogi becomes immune to poison and snake bites.
4. Kechari Mudra helps the practitioner to attain Samadhi or the super-conscious state.
5. The secretions when consumed give great benefits to the body.
6. Kechari Mudra is also used by yogis to do astral travelling. The Mudra helps the yogi to detach the astral body from the physical body and travel in the astral planes.

Jnana Mudra (Psychic Gesture of Knowledge)

The Sanskrit word Jnana means 'intuitive knowledge' and the word Mudra, for the purpose of this discussion, means 'attitude'; thus this hand position is known as the 'attitude of intuitive knowledge'.

Technique

1. Sit in any meditative asana.
2. Fold the index fingers of both hands so that the tips touch the inside root of their corresponding thumbs.

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3. Straighten the other 3 fingers and separate them slightly.
4. Place the hands on the knees, with the palms down wards.
5. The 3 unbent fingers and the thumb of each hand should point downwards towards the floor in front of the knees.
6. Relax your arms and hands.

Specialty

As it is a Mudra of knowledge, it enhances the knowledge. The tip of thumb has centers of pituitary and endocrine glands. When we press these centers by index finger the two glands work actively.

Time duration

There is no particular time duration for this Mudra. You can practice by sitting, standing or lying on bed whenever and wherever you have time.

Benefits

Increases memory power and sharpens the brain. Enhances concentration and prevents Insomnia. If we practice it regularly, it will cure all psychological. Disorders like Mental, Hysteria, Anger and Depression.

Chin Mudra (Psychic Gesture of Consciousness)

The Sanskrit word chin means 'consciousness'; therefore this hand position can be translated as the 'attitude of consciousness'.

Method- This Mudra is very similar to Jnana Mudra. Again the tip of the index finger can be either placed at the root of the thumb or so that the tip of the index finger is in contact with the tip of the thumb. The difference lies in the arrangement of the hands on the knees. During Chin Mudra the hands are placed so that the palms face upwards with the backs of the hands resting on the knees. The unbent fingers should also point forwards away from the body. The symbolic meaning is the same as Jnana Mudra.

Chinmaya Mudra (Gesture of Manifested Consciousness)

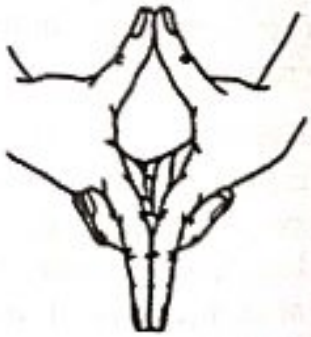
The Sanskrit word Chinmaya means 'manifested consciousness'; in other words, the phenomenal world around us that has arisen from the underlying consciousness.

Technique

1. Hold the fingers in the same way as depicted for Jnana Mudra.
2. Fold the 3 straightened fingers so that the tips touch or point towards the palm. The position of the thumb and index finger remains the same, whether the tips are in contact or if the tip of the index finger presses the root of the thumb. Both are correct.
3. Place the hands on the knees, palms upwards or downwards.

Yoni Mudra (Attitude of The Womb or Source)

1. Assume a comfortable meditation posture with the head and spine straight.
2. Place the palms of the hands together with the fingers and thumbs straight and pointing away from the body. Keeping the pads of the index fingers together, turn the little, ring and middle fingers inwards so that the backs of the fingers are touching.



3. Inter lock the little, ring and middle fingers.
4. Bring the thumbs towards the body and join the pads of the fingers together to form the base of a yoni or womb shape.

Benefits

1. The interlocking of the fingers in this practice creates a complete cross connection of energies from the right hand into the left and vice versa. As well as balancing the energies in the body.

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it helps balance the activities of the right and left hemispheres of the brain.

2. Placing the tips of the index fingers and thumbs together further intensifies the flow of Prana.
3. This Mudra makes the body and mind more stable in meditation and develops greater concentration, awareness and internal physical relaxation.

Bhairava Mudra (Fierce or Terrifying Attitude)

1. Assume a comfortable meditation posture with the head and spine straight.

2. Place the right hand on top of the left, so that the palms of both hands are facing up. Both hands then rest in the lap.
3. Close the eyes and relax the whole body, keeping it motionless.
4. Bhairava is the fierce or terrifying form of Lord Shiva, the aspect responsible for the dissolution of the universe. The two hands represent Ida and Pingala Nadis, and the union of the individual with the supreme consciousness. Bhairava Mudra is used in Prana Mudra. It may also be used during Pranayama and meditation practice.

Hridaya Mudra (Heart Gesture)

1. Sit in any comfortable meditation asana with the head and spine straight.

2. Place the tips of the index fingers at the root of the thumbs, as in chin and Jnana Mudras, and join the tips of the middle and ring fingers to the tips of the thumbs so they are placed side by side. The little finger remains straight.
3. Place the hands on the knees with the palms facing upward.
4. Close the eyes and relax the whole body, keeping it motionless.

Duration: This practice may be performed for up to 30 minutes.

Benefits

This Mudra diverts the flow of Prana from the hands to the heart area, improving the vitality of the physical heart. The middle and ring fingers relate directly to Nadis connected with the heart, while the thumb closes the Pranic circuit and acts as an energiser, diverting the flow of Prana from the hands to these Nadis.

Hridaya Mudra helps to release pent-up emotion and unburden the heart.

Shambhavi Mudra (Eyebrow Centre Gazing)

1. Sit in any comfortable meditation asana.

2. Keep the head and spine upright and straight, and place the hands on the knees in either chin or Jnana Mudra.
3. Close the eyes and relax the whole body.
4. Relax all the muscles of the face, including the forehead, the eyes and behind the eyes.
5. Slowly open the eyes and look ahead at a fixed point, keeping the head and the whole body absolutely still.
6. Next, look upward and inward, focusing the eyes at the eyebrow centre.
7. The head should not move.
8. When performed correctly the two curved eyebrows will form a V-shaped image at the root of the nose. This point is the location of the eyebrow centre.

Duration: Start with 5 rounds and gradually increase to 10 over a period of months.

Contra-indications: People suffering from glaucoma, diabetic retinopathy or those who have just had cataract surgery, lens implant or other eye operations, should not perform Shambhavi without expert guidance.

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Benefits

1. Physically, Shambhavi Mudra strengthens the eye muscles and releases accumulated tension in this area.
2. Mentally, it calms the mind, removing emotional stress and anger.
3. It develops concentration, mental stability and the state of thoughtlessness.
4. Regular practice of Shambhavi Mudra retards degeneration of the pineal gland and is therefore recommended for children from the age of eight onwards to balance their emotional development.

Nasikagra Dristi Mudra (Nose Tip Gazing Gesture)

In Sanskrit, Nasika means the nose and Agra means the end or tip, Drishti means the sight.

Method- Sit in comfortable meditative pose with spine erect. Keep the gaze straight and breathe normally. Relax the shoulder and place the palms on knees. Slowly move your eyes and try to look at the tip of the nose. Keep the gaze there for few seconds to start with. Hold the breath to get more concentration. Release the eyes when you feel pain or discomfort.

Benefits

It helps to develop concentration and used as part of any meditation techniques. It helps to strengthen the eye muscles. It can activate the Mooladhara Chakra.

Kaki Mudra (The Crow's Beak)

1. Sit in any comfortable meditation asana with the head and spine straight and the hands resting on the knees in either chin or Jnana Mudra.
2. Close the eyes and relax the whole body for a few minutes.
3. Open the eyes and perform Nasikagra Drishti by focusing both eyes on the nose tip.

4. Try not to blink the eyes throughout this practice.
5. Purse the lips forming a break through which air may be inhaled.
6. The tongue should be relaxed. Breathe in slowly and deeply through the pursed lips. At the end of inhalation close the lips and exhale slowly through the nose.
7. Repeat the process for 3 to 5 minutes.

Benefits:

1. Kaki Mudra cools the body and mind and soothes mental tensions, alleviating disorders such as high blood pressure.
2. In addition to the benefits of Nasikagra Drishti, the act of pursing the lips in this practice, together with the contact of the indrawn air with the membranes of the mouth, stimulates digestive secretions aiding the digestive process generally. It also purifies the blood.

Bhujangini Mudra (Cobra Respiration)

1. Sit in any comfortable meditation asana.
2. Close the eyes and relax the whole body, especially the abdomen.
3. Push the chin forward and up a little.
4. Try to suck in air through the mouth and draw it into the stomach, not the lungs, in a series of gulps as though drinking water.
5. Expand the stomach as much as possible.
6. Hold the air inside for as long as comfortable, then expel it by belching.

Duration: 3 to 5 times is sufficient for general purposes; for specific ailments it may be repeated more often.

Benefits

1. Bhujangini Mudra rejuvenates the oesophagus walls and the glands that secrete the digestive juices.
2. It tones the whole stomach, removes stagnant wind and helps alleviate abdominal disorders.
3. Retaining air in the stomach enables the practitioner to float in water for any length of time.

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Bhoochari Mudra (Gazing into Nothingness)

1. Sit in any comfortable meditation asana with the head and spine straight and the left hand in chin or Jnana Mudra.
2. Close the eyes and relax the whole body.
3. Open the eyes and raise the right hand in front of the face.
4. The elbow should point to the side of the body.

5. Hold the hand horizontally, palm down with all the fingers together.
6. The side of the thumb should be in contact with the top of the upper lip. Focus the eyes on the tip of the little finger and gaze at it intently for a minute or so without blinking or flickering the eyes.
7. Try to maintain continuous awareness of the fingertip.
8. After a minute remove the hand but continue to gaze into nothingness at the place where the little finger was in front of the face. Try not to blink.

Benefits: Same as for Nasikagra Drishti and Shambhavi Mudra. Bhoochari Mudra develops the power of concentration and memory. It tranquillises and introverts the mind and is particularly beneficial for people who express a lot of anger.

Shanmukhi Mudra (Closing the Seven Gates)

1. Sit in Siddha/Siddha yoni asana, if possible. Otherwise take comfortable meditation asana and place a small cushion beneath the perineum to provide pressure in this area.

2. Hold the head and spine straight. Close the eyes and place the hands on the knees.
3. Relax the whole body.
4. Raise the arms in front of the face with the elbows pointing sideways.
5. Close the ears with the thumbs, the eyes with the index fingers, the nostrils with the middle fingers, and the mouth by placing the ring and little fingers above and below the lips.
6. Release the pressure of the middle fingers and open the nostrils. Inhale slowly and deeply, using full yogic breathing. At the end of inhalation close the nostrils with the middle fingers.
7. Retain the breath inside for as long as is comfortable.
8. Try to hear any manifestation of sound in the region of Bindu, Ajna or Anahata chakras. There may be many sounds or none at all; just listen. After some time, release the pressure of the middle fingers and slowly breathe out.
9. This is one round.

Benefits

Physically, the energy and heat from the hands and fingers stimulate and relax the nerves and muscles of the face. Physically, this practice helps in the treatment of eye, nose and throat infections and to alleviate vertigo. Mentally, it balances the internal and external awareness. Spiritually, it induces the state of Pratyahara or sense withdrawal.

Viparеeta Karani Mudra (Inverted Psychic Attitude)

1. Assume the inverted posture of Viparеeta Karani Asana.
2. Keeping the legs straight and together, tilt them slightly over the head so that the eyes look straight up at the feet.

3. Close the eyes and relax the whole body. Fix the awareness at Manipura chakra in the spine, directly behind the navel. This is the starting position.
4. Inhale slowly and deeply with Ujjayi Pranayama. Feel the breath and consciousness moving from Manipura to Vishuddhi chakra situated in the spine, behind the throat pit.

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While exhaling, maintain the awareness at Vishuddhi.

5. At the end of exhalation, immediately bring the awareness back to Manipura and repeat the same process.
6. Continue for as long as the asana can be comfortably maintained.

Duration: Practise 5 to 7 rounds or until discomfort arises.

Benefits

1. This practice gives all the benefits of Viparеeta Karani asana. It balances hypoactive thyroid and acts as a preventative for cough, cold, sore throat and bronchial disorders.
2. It stimulates the appetite and digestion, and helps relieve constipation.
3. Regular practice prevents atherosclerosis by restoring vascular tone and elasticity. It relieves prolapsed, haemorrhoids, varicose veins and hernia, all of which are exacerbated by the downward pull of gravity.
4. Circulation to the brain is enhanced, especially to the cerebral cortex and pituitary and pineal glands. Cerebral insufficiency and senile dementias are counteracted and mental alertness increased.

Yoga Mudra (Attitude of Psychic Union)

1. Sit in Padmasana. Take hold of one wrist behind the back.
2. Close the eyes and relax the whole body. Bring the awareness to Mooladhara Chakra (slight Moolabandha may also be performed.)
3. Inhale slowly and feel the breath gradually rising from Mooladhara to Ajna chakra. Retain the breath for a few seconds and concentrate on Ajna chakra.
4. Exhale slowly while bending forward, synchronising the movement with the breath so that the forehead just touches the floor as the air is fully expelled from the lungs.
5. Final position is Yogamudrasana. Simultaneously, feel the breath gradually move downward from Ajna to Mooladhara chakra.
6. Retain the breath outside for a few seconds while concentrating on Mooladhara chakra.
7. Inhale, raise the trunk to the vertical position and be aware of the breath moving upward from Mooladhara to Ajna chakra.
8. All these movements should be performed in a harmonious, smooth and synchronised manner.
9. Remaining in the upright position, hold the breath for a few seconds while concentrating on Ajna Chakra.
10. Exhale slowly, moving the awareness back down the spine with the breath to Mooladhara Chakra.
11. This is one round.

Benefits

This practice gives all the benefits of Yogamudrasana. In addition it is an excellent preparatory practice for meditation. The pressure along the abdomen and chest created by the legs and heels calms the adrenal system, engendering a sense of relaxation. It relieves anger and tension, inducing tranquillity, and develops awareness and control of psychic energy.

Pashinee Mudra (Folded Psychic Attitude)

1. Assume Halasana. Separate the feet by about half a metre.
2. Bend the knees and bring the thighs towards the chest until the knees touch the ears, shoulders and floor. Wrap the arms tightly around the back of the legs.
3. Relax the whole body in this position and close the eyes.
4. Breathe slowly and deeply. Maintain the position for as long as is comfortable.
5. Slowly release the arms and come back into Halasana.

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6. Lower the legs and relax in Shavasana.

Benefits

Pashinee Mudra brings balance and tranquillity to the nervous system and induces Pratyahara, sense withdrawal. It stretches the spine and the back muscles and stimulates all the spinal nerves in and around the spine. It massages all the abdominal organs.

Manduki Mudra (Gesture of The Frog)

1. Sit in Bhadrasana with the toes pointing outward (Vajrasana Group of Asanas).
2. If it is not comfortable to sit with the toes pointing outward, sit in Bhadrasana with the toes pointing inwards.
3. The buttocks should rest on the floor. If this is still too difficult, place a folded blanket underneath the buttocks to apply firm pressure to the perineum, stimulating the region of Mooladhara chakra.
4. Place the hands on the knees, hold the spine and head straight. Close the eyes and relax the whole body. This is Manduki asana.
5. After some time, open the eyes and perform Nasikagra Drishti. If the eyes become tired relax them for a minute or so.
6. Continue the practice for 5 minutes until the mind and senses become introverted.

Benefits: The nose is related with Mooladhara Chakra through the sense of smell. This practice affects the brain centres related to man's most deep rooted instincts and drives. It calms the disturbances and fluctuations of the mind and balances Ida and Pingala Nadis. Perfection of this practice leads directly to meditation.

Tadagi Mudra (Barrelled Abdomen Technique)

1. Sit with the legs stretched out in front of the body and the feet slightly apart. The legs should remain straight throughout the practice.
2. Place the hands on the knees, keeping the head and spine straight.

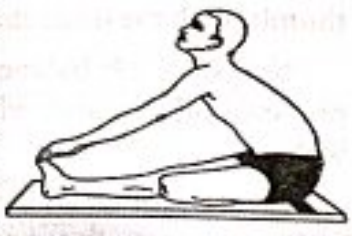
3. Close the eyes and relax the whole body, especially the abdominal area.
4. Lean forward and grasp the big toes with the thumbs, index and second fingers, keeping the head facing forward.
5. Inhale slowly and deeply, expanding the abdominal muscles to their fullest extent.
6. Retain the breath inside for a comfortable length of time without straining the lungs in any way.
7. Exhale slowly and deeply while relaxing the abdomen. Maintain the hold on the the toes.
8. Repeat the breathing up to 10 times. Then release the toes and return to the starting position.
9. This is 1 round.

Benefits

1. Tadagi Mudra relieves any tension stored in the diaphragm and pelvic floor tones the abdominal organs and stimulates blood circulation to these areas.
2. It improves the digestion and helps to alleviate diseases of this region.
3. The nerve plexuses in the visceral area are stimulated and toned.
4. Bending forward and extending the stomach stretches the diaphragm and pelvic floor, and creates pressure throughout the trunk of the body. This stimulates Manipura chakra, the centre of energy distribution, and raises the level of Prana generally.

Maha Mudra

Base position : Utthanpadasana (stretched teg pose)



1. Sit with the legs outstretched.
2. Bend the left knee and press the left heel firmly into the perineum or vulva,

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the location point of Mooladhara Chakra. The right leg remains outstretched.

3. Place both hands on the right knee. Adjust the position so that it is comfortable.
4. Bend forward just enough to be able to clasp the right big toe with both hands. Hold the position for a comfortable duration. Return to the upright position with both hands resting on the right knee.
5. This is one round.

Benefits

1. By the practice of Maha Mudra the combined benefits of Shambhavi Mudra, Moola Bandha and Kumbhaka are gained.
2. Digestion and assimilation are stimulated and abdominal disorders are removed.
3. Maha Mudra stimulates the energy circuit linking Mooladhara with Ajna Chakra. The whole system is charged with Prana which intensifies awareness and induces spontaneous meditation. Mental depression is rapidly eliminated by this practice as energy blockages are removed.

Prithvi Mudra-Mudra of Earth

Method: Tip of the ring finger touches the tip of the thumb, with the other three fingers stretched out.

Specialty: It reduces all physical weaknesses.

Time Duration: It has no particular time duration. You can practice it any time you want.

Benefits : It helps to increase the weight for weak people. It improves the complexion of skin and makes the skin to glow. It makes the body active by keeping it healthy.

Varuna Mudra-Mudra of Water

Method : Tip of little finger touches the tip of thumb, with the other three fingers stretched out.

Specialty : It balances the water content and prevents all diseases which come due to lack of water.

Time Duration : It has no specific time duration and one can practice it according to their time.

Benefits: It retains clarity in blood by balancing water content in the body. Prevents the pains of Gastroenteritis and Muscle Shrink

Vayu Mudra-Mudra of Air

Method: Keep the index finger on the base of the thumb and press with the thumb keeping the other three fingers straight.

Specialty: It prevents all the diseases that occur due to the imbalance of the air.

Time Duration: The practice of this Mudra for 45 minutes reduces the severity of the disease in 12 to 24 hours. For better results practice it for two months.

Benefits: It cures Rheumatism, Arthritis, Gout, Parkinson's disease and paralysis without any medicine. It is useful for Cervical Spondylitis, paralysis to face and catching of nerve in neck. It corrects the disorder of gas in the stomach.

Shunya Mudra - Mudra of Emptiness

Method: Keep the middle finger at the mount of Venus and press it with thumb.

Specialty: It reduces the dullness in our body.

Time Duration: One can practice it for 40 to 60 minutes daily until to be cured from the disease.

Benefits: It relieves an earache within 4 or 5 minutes. It is useful for the deaf and mentally challenged, but not for inborn ones.

Surya Mudra - Mudra of The Sun

Method: Bend the ring finger and press it with thumb.

Specialty: It sharpens the center in thyroid gland.

Time Duration: Practice it daily twice for 5 to 15 minutes.

Benefits: It reduces cholesterol in body and helps in reducing weight. It reduces anxiety. It corrects indigestion problems.

Prana Mudra - Mudra of Life

Method: Bend ring finger and little finger and touch the tip of thumb with their tips keeping the remaining two fingers stretched.

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Specialty: As it is the Mudra of life, it improves the power of life. Weak people become strong. It reduces the clamps in blood vessels. If we practice it regularly, we will become active.

Time Duration: No specific time duration. One can practice it any time.

Benefits: It improves immunity. Improves the power of eyes and reduces eye related diseases. It removes the vitamin deficiency and fatigue.

Apana Mudra - Mudra of Digestion

Method : The tips of middle finger and ring finger touch the tip of the thumb while the other two fingers are stretched out.

Specialty : It plays an important role in our health as it regulates the excretory system.

Time Duration : Practice it daily for 45 minutes, but practice for longer time yields more benefits.

Benefits : It regulates diabetes. It cures constipation and piles. It helps excreting the normal waste regularly.

Apana Vayu Mudra - Mudra of the Heart

Method : The tips of the middle finger and ring finger touch the tip of the thumb, while the index finger touches the base of thumb and little finger stretched out.

Specialty : It benefits the heart. It works like injection in the reduction of heart attack. It is as powerful as sorbitate tablet. It reduces the gas content in body.

Time Duration : Practice it as many times as you can. Heart patients and BP patients can practice it for 15 minutes daily twice for better results.

Benefits : It strengthens the heart and regularizes palpitation. It regulates excretory system. It redeems gastric trouble.]

Linga Mudra - Mudra of Heat and Energy

Method : Interlock the fingers of both the hands and keep the thumb of the left hand vertically straight and encircle it with the thumb and the index finger of the right hand.

Specialty : It generates heat in our body. Take milk, ghee, more water and fruit juices in addition to practice of this Mudra for much benefits.

Time Duration : Practice it any time you want. But don't practice it a lot as it produces heat in the body. It can cause sweating even in winter if you practice it longer.

Benefits : It stops production of phlegm and gives power to lungs. It cures severe cold and bronchial infection. It invigorates the body.

Ida-Pingala-Sushumna Nadis and Shad Chakras

Ida, Pingala and Sushumna are considered as Trinadi. I.e. three important channel through which the Kundlini Yoga the serpent power flows. In Shiva Samjita and Goraksha Samhita explains about 72,000 and 3.50,000 Nadis.

Ida Nadi- It is known as Chandra. It is related to left nostril

Nature- cold

Color- blue

Related letter- A

A channel of energy orientating from left nostril then moving up to the crown of head and then traversing down to the base of the spine also called Chandra Nadi.

Pingala Nadi - It is known as Surya Nadi. It is related to Right Nostril.

Nature- Hot

Color- Red

Related latter- U

It activates left cerebral hemisphere. A channel of energy originating from right nostril then moving or traversing to the center of head and then travels down to the base of spine.

Sushumna Nadi- A particular artery of human body said to lie between Ida and Pingala. It starts from the Muladhara Chakra and extends up to Bramharandhra located in the centre of head. The Brahma Nadi being situated within the inner most sheath of Sushumna

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Nature- normal

Color- yellow

Related letter- M

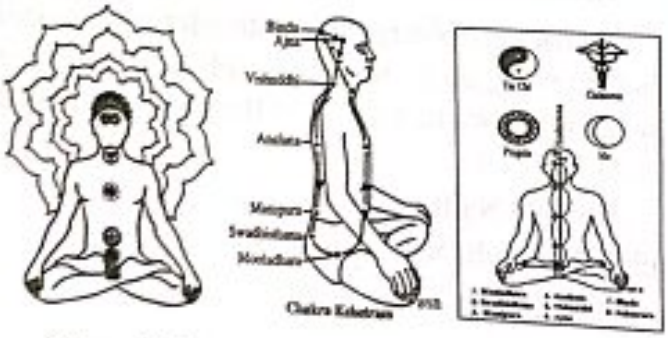
It having names Triveni and Bruhata Nadi, Bramharandhra, Mahapatha, Sambhavi, Madhyamarga etc.

Goraksha Samhita explain main 10 Nadis.

1. Ida - Left nostril
2. Pingala - Right nostril
3. Sushumna - Middle
4. Avalambusha - Mukha
5. Gandhari - left eye
6. Hastajiva - Right Eye
7. Yashasvini - left ear
8. Pushya - right ear
9. Kuhu - Lingadesha
10. Shakhini - Mula sthana(rectum)

Shiva Samhita explains main 14 Nadi above 10 and Varuna, Vishodhari, Sarasvati, Payasvini Nadi.

Shata Chakra



The chakras are Pranic centres within the human framework. In each person, there are myriad of chakras. However, only a few principal ones are utilized in yogic practice. These few are the ones which span the full spectrum of man's being from the gross to the subtle.

These main chakras are:

1. Mooladhara
2. Swadhisthana
3. Manipura
4. Anahata
5. Vishuddhi
6. Ajna
7. Sahasrara

Though we have included Sahasrara in this list, it is not really a chakra; it transcends the mall and includes all of the chakras and Sahasrara together because they are the basic centres common to many mind awakening systems throughout the world, including yoga. Together with another focal point called the Bindu they are the fundamental centres used in Kriyayoga techniques.

The word Chakra literally means 'wheel' or 'circle'. A better translation in the context of yoga is 'vortex' or 'whirlpool'. The chakras are vortices or whirlpools of Pranic energy at specific areas in the body which control the circulation of Prana permeating the entire human structure. They are beyond the realms of normal perception. Chakra is also widely known as Padma- 'lotus'.

In yoga and, in fact, in most Indian systems, the chakras are symbolized by lotus flowers.

Other systems use different symbols; for example, the Rosicrucian's symbolize the chakras by roses. The choice is arbitrary, but for the purposes of Kriya yoga we will use lotus flowers. Each of the main chakras is represented by a lotus with a specific colour and number of petals as follows:

1. Mooladhara - four-petal deep red lotus
2. Swadhisthana - six-petal vermilion lotus
3. Manipura - ten-petal bright yellow lotus
4. Anahata - twelve-petal blue lotus
5. Vishuddhi - sixteen-petal violet lotus
6. Ajna - two-petalled silver-blue lotus
7. Sahasrara - thousand-petal lotus of all colours.

Attributes of the chakras

Although the meaning of each chakra can never be explained in words, especially the higher chakras, there are general attributes associated with each one. These don't represent the experience of the chakras, only the expression and feelings of a person at any particular chakra level.

The following are very basic attributes that we associate with the main chakras.

1. Mooladhara. This is the centre where one is almost totally concerned with obtaining personal security. That is, one's main motive

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in life is directed towards obtaining food, a place to live and so forth. It is the centre where the individual fights the world, which is regarded as being totally alien.

2. Swadhisthana. This centre is associated with the predominant motive of seeking personal pleasures and sensations through food, drink, sex, etc.
3. Manipura. This is the centre of self-assertion. One attempts to dominate situations and other people. One seeks to manipulate the world according to personal wishes. This is expressed in the predominant motive of gaining wealth, respect, etc.
4. Anahata. This is the centre where one begins to love and understand people for what they are, regardless of faults, idiosyncrasies, etc. One begins to accept other people.
5. Vishuddhi. This is the centre where one begins to understand and experience the world as a place of harmony and perfection. It is the centre where Shiva consumes the poison and the nectar, meaning that all experiences, good or bad are seen as part of an integrated whole, all of which help to remove one's personal problems and conditioning and thereby raise the level of consciousness. The world becomes a veritable Garden of Eden.
6. Ajna. This is the centre where one becomes an actor on the stage of the world, seeing everything as almost a dream. All actions, thoughts and objects, including one's own body and mind, are observed from the centre of one's being. This is the witnessing centre.

The chakras can also be divided into three approximate classes as follows:

1. Mooladhara and Swadhisthana, the two lower chakras, are predominantly negative or Tamasic in nature. That is, one's actions tend to be Adharmic, disharmonious and not in accordance with one's individual nature.
2. Manipura and Anahata, the two middle chakras, are a mixture of both negative and positive qualities. This is the level where rajas predominate; where actions and thoughts are a combination of dharma and Adharma.
3. Vishuddhi and Ajna, the two higher chakras, are predominantly positive (satwika). One tends to follow dharma, where one's actions and thoughts are in accordance with one's individual nature.

Mooladhara Chakra

The Sanskrit word Moola means 'root' or 'base'; the word Adhara means 'substratum' or support'. Therefore, the word Mooladhara means 'the basic substratum'; this chakra is the fundamental root or framework of individual human existence. It is the platform from which each person can express himself or herself as an individualized centre of being. It is the springboard to more elevated levels of understanding. This centre is also widely known as the Adhara Chakra - 'the support centre'.

Location	:	Perineum
Colour	:	Red, Yellow
Spokes	:	4
Mantra	:	LAM
Element	:	Prithivi (Earth)
Ruling Deities	:	Brahma, Dakini
Activity	:	Smell, Excretion

Description

Resting place of Kundalini Shakti, which coils around Svayambhu Lingam in the middle of Traipura Trikona, or Mahayoni. Connected to Apana Vayu and Kandarpa vayu. Frequently (though not always) assigned as the seat of Kanda.

Svadhisthana Chakra

The Sanskrit word Swa means 'one's own' and Adhisthana means 'dwelling place', 'residence'. Therefore, swa+adhisthana = Swadhi-sthana, which means 'one's own abode'. This chakra is regarded as being the

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substratum, the basis of individual human existence. This is explainable when one knows that this chakra is generally associated with the unconscious mind with its store house of mental impressions - Samskaras.

Individual being takes root in the unconscious mind. The many instinctive drives that are felt at the level of Swadhisthana chakra bubble up from the depths of the unconscious mind.

Swadhisthana is indeed the basis, the abode from which most people express themselves in the world. It is their basis for living life. It is also said that Swadhisthana chakra was once the seat of the Kundalini, but that there was a fall, a further fall, and Kundalini descended to the Mooladhara chakra.

Location	:	Clitoris, Base of Penis
Colour	:	Vermilion, white
Spokes	:	6
Mantra	:	VAM
Element	:	Apas (Water)
Ruling Deities	:	Vishnu, Rakini
Activity	:	Taste, Urination

Description

Seat of the passions and unconscious desires. Development here brings mastery over base instinct, one becomes an object of adoration and love, fearless, and achieves fluent and compelling communication skills. Connected to Vyana Vayu.

Manipura Chakra

The Sanskrit word Mani means 'gem' or 'jewel'; the word Pura means 'city'. Therefore, the word Manipura can be translated directly as 'the city of gems'. It is so called because of the intensity of the Pranic energy at this centre. In the Gautamiya Tantra it says: "The Manipura chakra is so called because it is lustrous like a sparkling jewel." (ch. 34) It is often compared to the dazzling power of the sun, which continually radiates energy to the planets.

Location	:	Navel
Colour	:	Dark grey, red, blue (also gold)
Spokes	:	10
Mantra	:	RAM
Element	:	Tejas (Fire)
Ruling Deities	:	Rudra, Lakini
Activity	:	Vision, Walking

Description

Considered the seat of all fires: digestion, willpower, solar resonance, etc. Contains the power of creation and destruction. Shining, powerful, forceful. Mastery brings freedom from disease, alchemical ability, clairvoyance, and lasting happiness. Related to Samana vayu.

Anahata Chakra

The Anahata chakra is the fourth chakra, coming after the Mooladhara, Swadhisthana and Manipura chakras. It is located in the heart region of the spine.

The word Anahata means 'unstuck' or 'unbeaten'. Therefore, the Anahata chakra is the centre of unbeaten sound. That is, the cosmic sound (Shabda Brahman) is heard at this centre . . . a sound that does not arise as a result of two objects hitting each other as do other sounds. The sound that is heard is uncaused.

This chakra is also widely called the Hridaya chakra, heart centre, because of its location.

Location	:	Chest
Colour	:	Deep red, gold, smoke
Spokes	:	12
Mantra	:	YAM
Element	:	Prana (Air)
Ruling Deities	:	Ishvara, Kakini
Activity	:	Touch, Moving Arms

Description

Considered to be the seat of the individual soul (for details, see Secondary Chakras). Governs qualities of wisdom, nobility, and control of the senses. Mastery of this center makes one endearing to the opposite sex, brings inspired speech, and the

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ability to enter another's body. Also, full knowledge of past, present, and future, and powers of levitation are available from contemplating on this center. Related to Prana Vayu.

Vishuddha Chakra

Vishuddhi

The first two are generally associated with the attributes of Tamas. The third and fourth chakras are associated with the qualities of rajas. In this topic we will introduce the first of the Sattwic chakras, the Vishuddhi chakra. The word Sattwa means purity, understanding, peace and other qualities that lead to and are an expression of both inner harmony and harmonious interactions with other people and the outside world in general.

Vishuddhi chakra is located in the throat region and comes immediately above the Anahata chakra in the ascending order of the chakras.

Location	:	Throat
Colour	:	Smoky purple, Blue, White
Spokes	:	16
Mantra	:	HAM
Element	:	Akasha (Void)
Ruling Deities	:	Sadashiva, Shakini
Activity	:	Hearing, Speech

Description

Centre of pristine purity and the first "gateway" to significant spiritual realization. Contains the foundational energy for manifestation – Akasha – as the background unifying essence of the lower four elements of earth, water, fire, and air. Mastery brings about enduring peacefulness and sagacious wisdom. Related to Udana Vayu and Soma.

Ajna Chakra

The Ajna chakra is the sixth and last of the chakras that we will discuss. It represents the highest of the psychic centres in man. Above this level are Bindu and Sahasrara, which are not chakras or psychic centres - they really come into the realm of the ineffable.

Ajna

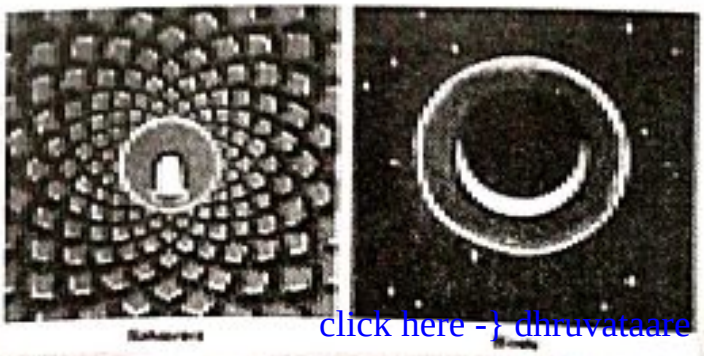
The Sanskrit word Ajna means 'command'. This chakra is so called because it represents the level of awareness and harmony where it is possible for direct mind to mind communication between two people. It is the stage of sensitivity where individual minds can meet. It is the centre through which the guru communicates with his disciples and gives them commands. It is the link or bridge between the guru and disciple; therefore, this chakra is often called the guru chakra. It is the gateway to the inner temple of subtle initiation. The most common name is the third eye - the psychic eye that is located midway between the two physical eyes. This is the eye that looks inwards instead of outwards.

Location	:	Forehead (alt: between eyebrows)
Colour	:	White
Spokes	:	2
Mantra	:	OM
Element	:	Manas (Mind)
Ruling Deities	:	Paramashiva, Hakini
Activity	:	Consciousness

Description

Control centre for all mental activity, including regulation of sense faculties (Indriyas). Unification point of Ida, Pingala, and Sushumna Nadis. Seat of polarity archetypes – masc./fem., Shiva/Shakti, etc. Mastery of this centre eradicates karma, and gains all the powers of the lower five chakras.

Sahasrara Chakra



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Location : Above head, facing down
Color : White
Spokes : 1,000

Description

Seat of Atman. Center of enlightenment – not technically a chakra as it is completely transcendent and unrelated to the standard makeup of the lower six centers. Abode of pure, unqualified existence, liberation from suffering, total unification.

Pratyahara

Pratyahara is as one of the eight limbs (Ashtanga Yoga). Pratyahara enhances the power of concentration of senses. Pratyahara is drawing in of the senses by giving up their own objects and settled in the original state of mind.

स्वविषयासम्प्रयोगे चित्तस्य स्वरूपानुकार इवेन्द्रियाणां प्रत्याहारः । (प.यो.सू. 2/54)

विषयेभ्यः इन्द्रियार्थेभ्यो मनोनिरोधः प्रत्याहारः ।
(मण्डल उपनिषद 1/1-7)

प्रत्याहारः स विज्ञेयोऽभ्यासनीयो मुहुर्मुहुः । (ब्रह्मणोपनिषद)

Withdrawal of the senses from all wordily desires and temptations and keeping them fixed in the pure nature of Citta or mind is called Pratyahara.

Pratyahara is a bridge between the Bahiranga and Antranga phases of Ashtanga yoga.

Control of the Senses (Indriya-Pratyahara)

Indriya-Pratyahara, or control of the senses, is the most important form of Pratyahara, although this is not something that we like to hear about in our mass media-oriented culture. Most of us suffer from sensory overload, the result of constant bombardment from television, radio, computers, newspapers, magazines, books etc.

Control of the Prana (Prana-Pratyahara)

Control of the senses requires the development and control of Prana because the senses follow Prana (our vital energy). Unless our Prana is strong we will not have the power to control the senses. If our Prana is scattered or disturbed, our senses will also be scattered and disturbed.

Pranayama is a preparation for Pratyahara. Prana is gathered in Pranayama and withdrawn in Pratyahara. Yogic texts describe methods of withdrawing Prana from different parts of the body, starting with the toes and ending wherever we wish to fix our attention-the top of the head, the third eye, the heart or one of the other chakras.

Control of Action (Karma-Pratyahara)

We cannot control the sense organs without also controlling the motor organs. In fact the motor organs involve us directly in the external world. The impulses coming in through the senses get expressed through the motor organs and this drives us to further sensory involvement. Because desire is endless, happiness consists not in getting what we want, but in no longer needing anything from the external world.

Withdrawal of the Mind (Mano-Pratyahara)

The yogis tell us that mind is the sixth sense organ and that it is responsible for coordinating all the other sense organs. We take in sensory impressions only where we place our mind's attention. In a way we are always practicing Pratyahara. The mind's attention is limited and we give attention to one sensory impression by withdrawing the mind from other impressions. Wherever we place our attention, we naturally overlook other things.

According to the Yoga Sutras "When the senses do not conform with their own objects but imitate the nature of the mind, that is Pratyahara."

Pratyahara and the Other Limbs of Yoga

Pratyahara is related to all the limbs of yoga. All of the other limbs-from asana to Samadhi-contain aspects of Pratyahara. For example, in the sitting poses, which are the most important aspect of asana, both the sensory and motor organs are controlled. Pranayama contains an element of Pratyahara as we draw our attention inward through the breath. Yama and Niyama contain various principles and practices, like non-violence and contentment that help us control the senses. In other words, Pratyahara provides the foundation for the

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higher practices of yoga and is the basis for meditation. It follows Pranayama (or control of Prana) and, by linking Prana with the mind, takes it out of the sphere of the body.

Pratyahara is also linked with Dharana. In Pratyahara we withdraw our attention from Ordinary distractions. In Dharana we consciously focus that attention on a particular object, such as a mantra. Pratyahara is the negative and Dharana the positive aspect of the same basic function.

Dharana

Dharana or concentration is the fixing the mind on one place. Dharana is the fixing of the mind on something external or internal. The mind can be fixed externally on the picture of Lord Hari, Lord Krishna or Lord Rama or on any other object or point. Internally it can be fixed on any Chakra or any part of the body or on any abstract idea. Having controlled the Prana through Pranayama and the Indriyas through Pratyahara, you should try to fix the mind on something. In Dharana you will have only one Vritti or wave in the mind-lake.

देशबन्ध चित्तस्य धारणा । (प.यो.सू. 3/1)

Dharana is the confining [fixing] of the mind within a point or area.

मनः संकल्पकं ध्यात्वा संक्षिप्यात्मनि बुद्धिमान धारयित्वा तथात्मानं धारणम् परिकिर्तिता ॥ (अमृतनादोपनिषत)

"A Yogi should always avoid fear, anger, laziness, too much sleep or waking and too much food and fasting. If the above rule he well and strictly practiced each day, spiritual wisdom will arise of itself in three months without doubt. In four months, he sees the Devatas; in five months, he knows (or becomes) Brahmanishtha; and in six months, he attains Kaivalya at will. There is no doubt." Amritananda-Upanishad.

"Having made Atman as the lower Arani (sacrificial wood) and the Pranava as the upper

Arani, one should see the God in secret through the practice of churning which is Dhyana (meditation)." Dhyanabindu-Upanishad.

Before you begin the practice of concentration, you will do well to know something about the subconscious mind and its functions. In the Vedanta philosophy the subconscious mind is called Chitta. When the Chitta is confined and fixed to a certain point or object, this is called concentration. A great deal of your sub consciousness is but bundles of submerged experiences which can be brought to the surface of the conscious mind by means of concentration.

You must evince good interest in the practice of concentration. Then only your whole attention will be directed towards the object upon which you wish to concentrate. There can be really no concentration without a remarkable degree of interest and attention shown by the practitioner.

Attention is steady application of the mind. It is focussing of consciousness on some chosen object. Through attention you can develop your mental faculties and capacities. Where there is attention, there is also concentration. Attention should be cultivated gradually. It is not a special process. It is the whole mental process in one of its aspects.

Perception always involves attention. To perceive is to attend. Through attention you get a clear and distinct knowledge of objects. The entire energy is focussed on the object towards which attention is directed. Full and complete information is gained. During attention all the dissipated rays of the mind are collected. There is effort or struggle in attention. Through attention a deeper impression of anything is made in the mind. If you have good attention, you can attend to the matter in hand exclusively. An attentive man has very good memory.

There are again two other kinds of attention viz, voluntary attention and involuntary attention. When the attention is directed towards some external object by an effort, of the will, it is called voluntary attention. When you have an express volition to attend to this or that, it is called involuntary attention. The man understands why he perceives. Some deliberate intention, incentive, goal or purpose is definitely involved. Voluntary attention needs effort, will, determination and some

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mental training. This is cultivated by practice and perseverance. The benefits derived by the practice of attention are incalculable. Involuntary attention is quite common. This does not demand any practice. There is no effort of the will. The attention is induced by the beauty and attractive nature of the object. Individuals perceive without knowing why and without observed instruction. Young children possess this power of involuntary attention to a greater degree than grown-up people.

Napoleon, Gladstone, Arjuna and Jnanadeva had all wonderful powers of attention. They could fix their minds on any object. All scientists and occultists possess attention to a remarkable degree. They cultivate it by patience, regular and systematic practice. A judge and a surgeon can get positive success in their respective professions only if they are endowed with the power of attention to a high degree.

Dhyana

Dhyana is a term used for the seventh Anga (limb or level) in the eight-step Yoga practice of Sage Patanjali.Ācccording Nabhikkshu "when after achieving Dharana on some point, one's mind has succeeded for a sufficient time in holding itself before itself under the form of the object of meditation, without any interruption caused by the intrusion of any other function, one attains Dhyana". This state is penultimate to Samadhi or "absorption." Unfortunately, the word Dhyana is usually translated as meditation, implying a state of abiding calm. Earlier to practicing Dhyana, the relevant steps of Yoga, namely, Yama, Niyama, Asana, Pranayama, Pratyahara, and Dharana should be practiced. Meditation is a generic word stretching from sitting quietly to deep inward focus as practiced in many traditions.

तत्र प्रत्ययैकतानता ध्यानं ।(प.यो.सू. 3/2)

Unbroken continuation of that mental ability is meditation.

उमार्धदेहं वरदं सर्वकारणकारणम ।
आकाशधारणात्तस्य खेचरत्वं भवेदध्रुवम ॥
यत्रकुत्र स्थितो वापि सुखमत्यन्तमश्नुते ।
एवं च धारणाः पञ्च कुर्यादयोगी विचक्षण ॥
ततो दृढशरिरः स्यान्मृत्युस्तस्य न विद्यते ।
ब्राह्मणः प्रलयेनापि न सीदति महामतिः ॥
(योगतत्वो उपनिषद 101-103)

By practicing Dharana in the region of Akasha, he obtains certainly the power of levitating in the Akasha (ether). Wherever he stays, he enjoys supreme bliss. The proficient in Yoga should practice these five Dhahran's. Then his body becomes strong and he does not know death. That great-minded man does not die even during the deluge of Brahma.

समभ्यसेत्तथा ध्यानं घटिकाषष्टिमेव च ।
वायुं निरुध्यं चाकाशे देवतामिष्टदामिति ॥
सगुणं ध्यानमेतत्स्यादणिमादिगुणप्रदम ।
निर्गुणध्यानयुक्तस्य समाधिश्च ततो भवेत ॥
(योगतत्वो उपनिषद 104-105)

Then he should practice Dharana for a period of six Ghatikas (2 hours, 24 minutes). Restraining the breath in (the region of) Akasha and contemplating on the deity who grants his wishes – this is said to be Saguna Dhyana capable of giving (the Siddhis) Anima, etc. One who is engaged in Nirguna Dhyana attains the stage of Samadhi. Meditation on Lord Krishna, Lord Siva, Lord Rama or Lord Jesus is Saguna meditation. Meditation on Om, Soham, Sivoham, Aham Brahma Asmi and Tat Tvam Asi is Nirguna meditation.

The best and the most congenial time for the practice of meditation is unquestionably the Brahmamuhurta i.e., from 4 to 6 a.m. That is the time when the mind is quite refreshed after an agreeable slumber, when the mind is calm and comparatively pure.

Meditation techniques include specific postures, focused attention, or an open attitude toward distractions. People use them to increase calmness and relaxation, improve psychological balance, cope with illness, or enhance overall health and well-being. Meditation is based on a mental process to calm and reduce psycho-physiologic load on a person due to reasons cited above. The consequence of such a practice is lowered

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metabolism that goes by the well-known phrase, relaxation response

ध्यान भेदा–

स्थूलं ज्योतिस्तथा सूक्ष्मं ध्यानस्य त्रिविध विदुः ।
स्थूलं मूर्तिमयं प्रोक्तं ज्योतिस्तेजोमयं तथा ॥
सूक्ष्मं बिंदुमयं ब्रह्म कुण्डलीपरदेवता ।
(घे.स. 6/1)

The Dhyana is of three types, Sthula, Jyoti and Sukshma.

Sthula Dhyana (Ref Ghe. Sa. 6/2-14)-When a particular figure, such as one's Guru is contemplated, it is Sthula.

Jyoti Dhyana (Ref Ghe. Sa. 6/15-17)- When Brahma is contemplated as mass a light it is called Jyoti Dhayna.

Sukshma Dhyana (Ref Ghe. Sa. 6/18-21)- When Brahma as a Bindu or point and Kundali force are contemplated, it is Sukshma.

Dhyana is practiced to break old Samskara; it is based on total Vairagya or complete detachment. All attachment to body and mind should be transcended and only the motive to reach reality should light the path to liberation. Another significant difference between awareness practices and Dhyana is this: in the former, we seem to transcend the mind and seem lifeless, whereas in Dhyana, we are totally aware of our state.

Samadhi

The fruit of meditation is Samadhi. Samadhi is super conscious state, wherein the Yogi gets super intuitional or super sensual knowledge and super sensual bliss. Samadhi is the eighth step of the Yogic ladder. Intuition, revelation, inspiration and ecstasy are all synonymous terms.

दिनदवादशकेनैव समाधिं समवाप्नुयात ।
वायुं निरुध्यं मेधावी जीवन्मुक्तो भवत्ययम ॥
समाधिः समतावस्था जीवात्मपरमात्मनोः ।
यदि स्वदेहमुत्सृष्टं मिच्छा चेदुत्सृजेत्स्वयम ॥
परब्रह्मणि लीयेत न तस्योत्क्रान्तिरिष्यते ।
अथ नो चेत्समुत्सृष्टुं स्वशरिरं प्रियं यदि ॥
(योगतत्वो उपनिषद)

Within twelve days at least, he attains the stage of Samadhi. Restraining his breath, the wise one becomes an emancipated person.

तदेवार्थमात्रनिर्भासंस्वरुपशून्यमिव समाधिः ।
(यो.सू. 3/3)

Samadhi is that state in which the Jivatman (lower self) and the Paramatman (higher Self) are difference less (or of equal state). If he desires to lay aside his body, he can do so. He will become absorbed in Parabrahman and does not require Utkranti (going out or up). But if he does not so desire and if his body is dear to him, he lives in all the worlds possessing the Siddhis of Anima, etc. Sometimes he becomes a Deva and lives honored in Svarga; or he becomes a man or a Yaksha through his will. He can also take the form of a lion, tiger, elephant, or horse through his own will.

Yajnavalkya, the greatest Yogi says: "By Pranayama impurities of the body are destroyed; by Dharana or concentration impurities of the mind. By Pratyahara the impurities of attachment and by Samadhi everything that hides the Soul is removed."

शाम्भवी चैव खेचर्यां भ्रामर्यां योनिमुद्रया ।
ध्यानं नादं रसानन्दं लयसिद्धिश्चतुर्विधा ॥
पञ्चधा भक्ति योगेन मनोमूर्च्छा च षडविधा ।
षडविधोऽयं राजयोगः प्रत्येकवधारयेत ॥
(घे.स. 7/5-6)

The Samadhi is four folds- Dhyana Samadhi, Nada Samadhi, Rasananda Samadhi and Laya Samadhi respectively accomplished by Shambhavi Mudra, Khechari Mudra, Bramari Mudra and Yoni Mudra. The Bhakti Yoga Samadhi is Fifth, and Raja-Yoga Samadhi, attained through Mano-Murccha Kumbhaka is the Sixth form of Samadhi.

Dhyana Yoga Samadhi

शाम्भवीं मुद्रिकां कृत्वा आत्मप्रत्यक्षमानयेत ।
बिन्दुब्रह्ममयं दृष्ट्वा मनस्तत्र नियोजयेत ॥
(घे.स. 7/7)

Performing the Sambhavi Mudra perceive the Atman. Having seen once the Brahman in a Bindu, fix the mind in that point.

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Nada Yoga Samadhi

साधनात खेचरिमुद्रा रसनोर्ध्वगता यदा।
तदा समाधिसिद्धिः स्याद्धित्वा साधारणक्रियाम॥
(घे.स. 7/9)

Turn the tongue upwards, closing the wind passages by performing the Kechari Mudra; by so doing Samadhi will be induced; there is no necessity of performing anything else.

Rasananda Yoga Samadhi

अनिलं मन्दविगेन भ्रामरीकुम्भकं चरेत।
मन्दं मन्दं रेचयेद्वायुं भृङ्गनादं ततो भवेत॥
अन्तःस्थः भ्रामरीनादं श्रुत्वा तत्र मनो नयेत।
समाधिर्जायते तत्र आनन्दः सोऽहमित्यतः॥
(घे.स. 7/10-11)

Let him perform the Bhramari Kumbhaka, drawing in the air slowly; expel the air slowly and slowly, with a buzzing sound like that of bettle. Let him carry the manas and place it in the centre of this sound of Humming beetle. By so doing, there will be Samadhi and by this, knowledge of so 'ham' arises and a great happiness takes place.

Layasidhi Yoga Samadhi

योनिमुद्रां समासाद्य स्वयं शक्तिमयो भवेत।
सुशृंगाररसेनवै विहरेत परमात्मनि।
आनन्दमयः सम्भूत्वा ऐक्यं ब्रह्मणि सम्भवेत।
अहं ब्रह्मेति चाव्दैतं समाधिस्तेन जायते॥
(घे.स. 7/12-13)

Perform the Yoni Mudra, and let him imagine that he is Sakti and Paramatman is Purusa; and that both have been united in one. By this he becomes full of bliss, and realises Aham Brahma. This conduces to Advaita Samadhi.

Bhakti Yoga Samadhi

स्वकीयहृद्ये ध्यायेदिष्टदेवस्वरुपकम।
चिन्तयेद भक्तियोगेन परमाहादपूर्वकम॥
आनन्दाश्रुपलकेन दशाभावः प्रजायते।
समाधिः सम्भवेत्तेन सम्भवेच्च मनोन्मनी॥
(घे.स. 7/14-15)

Let him contemplate within his heart his special diety; let him be full of ecstasy by such contemplation, let him shed tears of happiness, and by so doing he will become entranced. This leads to Samadhi and Maninmani.

Rajayoga Samadhi

मनोमूर्च्छा समासाद्य मन आत्मनि योजयेत।
पर्त्मनः समायोगात समाधिम् समवाप्नुयात॥
(घे.स. 7/16)

Performing Manomurccha Kumbhaka unite the Manas with the Atman. By this union is obtained Raja-Yoga Samadhi.

Samadhi is of two kinds viz., Savikalpa Samadhi and Nirvikalpa Samadhi.

Savikalpa Samadhi - Savikalpa is a lower Samadhi. In the Savikalpa Samadhi the Samskaras or latent impressions are not fried in to. There is support for the mind. There is still the triad of subtle type viz., the seer, sight and seen, or the knower, knowledge and knowable. So Savikalpa Samadhi cannot give full satisfaction, full freedom, full bliss and knowledge. Ramadas, Tulasidas, Kabir,Tukaram, Mira, Gouranga, Hafiz, Madhva and Ramanuja had the experience of cosmic consciousness (Savikalpa Samadhi).

Nirvikalpa Samadhi - In Nirvikalpa Samadhi all Samskaras are burnt in to. There is no support for the mind. The mind has merged into the all-pervading Spirit. There is no triad of seer, sight and seen, and so forth. Nirvikalpa Samadhi gives full satisfaction, full freedom, full bliss and full knowledge. Sankara, Dattatreya, Vamadeva, Jada Bharata, Madalasa and Yajnavalkya had all the experience of super cosmic consciousness (Nirvikalpa Samadhi).

There is also another classification viz., Jada Samadhi and Chaitanya Samadhi. In Jada Samadhi there is no awareness. It is more or less like deep sleep. The Yogi does not return with intuitional knowledge.

Jada Samadhi cannot give liberation or Mukti. It is more like an acrobatic feat. The Samadhi that we often hear of persons entering into, in public places is nothing but Jada Samadhi. In the other variety of Samadhi viz., Chaitanya Samadhi, there is "perfect awareness". The Yogi has intuitional knowledge.

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According to Muktiopanishad of Sukla Yajurveda, Through the force of the practice of Dhyana, the current of the modification of Manas devoid of Self that is of Brehmic nature is said to be Sarmprajnata Samadhi, while the mind with the utter quiescence of modifications that confers upon one supreme bliss is said to be Asamprajnata-Samadhi that is dear unto Yogins. This [state] that is devoid of light, Manas and Buddhi, and that is of the nature of Chit (consciousness merely) is styled by the Munis Atadvyavrtti Samadhi (a Samadhi that does not care or require the aid of author). It is Plenum above, below and in the middle, and is of the nature of Shiva (auspiciousness). This noumenal (or occult) Samadhi is itself Vidhi-Mukha (sanctioned by books or Brahma).

एवं मिथः समाधिः स्यात सर्वसंकल्पवर्जितः।
स्वदेहे पुत्रदारादिबान्धवेषु धनादिषु।
सर्वेषु निर्ममो भूत्वा समाधिं समवाप्नु यात॥
(घे.स. 7/21)

Samadhi obtained, free from all desires. Free from attachments to his own body, to son, wife, friends, kinsmen, or riches; beings free from all, let him obtain fully the Samadhi.

Description of Yoga in Ayurveda

Ayurveda and Yoga have been connected for thousands of years ago because of the ancient system that is concerned in the healing of the mind and body.Yoga and Ayurveda are the unique sciences of antiquity. Both are developed and practiced in similar circumstances with similar objectives in the same land. Ayurveda a comprehensive science of the life was developed to ensure Arogya, which is the mean to achieving the four Purushartha namely Dharma, Artha, Kama, Moksha. The both science aim to achievement of salvation or Moksha.

धर्मार्थ काममोक्षाणां आरोग्यं मूलमुत्तमम।
(च.सू. 1/15)

Health is the main root through which, one can achieve salvation or Moksha.

जन्मौषधिमण्त्रतपः समाधिजाः सिद्धयः।
(यो.सू. 4/1)

Yoga and Ayurveda are allied disciplines; both have advocated Aoushadhi, Matra, Japa, Samadhi etc. as the means of achieving their objectives. Beside spiritual paths Yoga also teaches the uses of drugs for Chitta Shuddhi.

योगे मोक्षे च सर्वसां वेदनानामवर्तनम।
मोक्षे निवृत्तिनिः शेषा योगोमोक्षप्रवर्तकः॥
(च.शा. 1/37)

Charaka Samhita, one of the foremost Ayurvedic classics deals with highest category of Yoga. It describes very vividly. The concept of Prajna and the feature of a Yogartha Purusha i.e. Sthita Prajna almost in a similar manner as the concept of Ritambara Prajna described in Yoga Sutras of Patajanli and that of Yogastha Purusha in Bhagavad Gita.

Acharya Charaka has been given detailed account of Bahiranga practice like Yama, Niyama etc. in the context of Sadavritta and Acahara Rasayana (Cha. Chi 1/3). He also specific described the state of higher achievement of Yoga practice including the ultimate realization i.e. Satyabhuddhi and the achievement of Siddhi. The concept of Satya propounded by Charaka which appears to be a more vividly defied and comprehensive entity than Ritambara Prajna is completely incorporated in Charaka Acharya concept of Satyabuddhi.

आवेशश्चेतसं ज्ञानमर्थानां छन्दतः क्रिय।
वृष्टिः श्रोत्र स्मृतिः कान्ति इष्टतश्चाप्यदर्शनम।
(च.शा. 1/141)

These are very similar to Siddhi described by Patanjali in Yogasutara. Thses can be achieved by the following the path of Yoga. Thus Ayurveda conceives the purest form of yoga and considers, it primarily as the means of Tatva Jnana, liberation and mental Pease.

कर्मजास्तेष्यहेतुकाः।
नश्यन्ति त्वक्रियाभिस्ते क्रियाभिः कर्मसंक्षये।
(सु.उ. 40/103)

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टिकाकार डल्हण–
क्रियाभिः प्रायश्चितजपहोमोपहारादिरुपाभिः ।
तेषु कर्मजादिषु त्रिषु कर्मजा अहेतुका दोषागन्तुहेत्तुरहिताः ।

The Karmaja Roga are not curable through medicine these can be cured by Prayashcita, Japa, Tapa, Homa and Upachara etc. by reducing Karmaja of part of life.

तपांसि तीव्राणि तथैव दानं व्रतानि धर्मो नियमाश्च सत्यम ।
गुणास्तथाऽष्टावपि तेषु नित्या व्यस्ताः समस्ताश्च यथाप्रभावम ।
(सु.उ. 60/21)

Tapa, Triveni, Dana, Vrata, Dharma, Niyama, Satya and religious practices as well as the Ashta Aishawarya are either wholly or partially in the Graha according to the degree of their respective power.

तेषां शान्त्यर्थमन्विच्छन वैद्यस्तु सुसमाहितः ।
जयै सनियमैहोमैरारभेत चिकित्सातुम ॥
(सु.उ. 60/30)

These Graha's may be cured by only Shoucha, Snana, Bramhacharya and chanting Gayatri Mantra.

प्राणायामोव्देजनत्रासनानि सुचीतोदैः संभ्रमश्चात्र शर्तः ॥
(सु.उ. 30/16)

Hiccup should be treated through the practice of Pranayama. In Kshudra and Annaja Hikka, Pranayama is advices.

निशाचरेभ्यो रक्ष्यस्तु नित्यमेव क्षतातुरः ।
रक्षाविधानैरुद्धिष्टैयमैः सनियमैस्तथा ॥
(सु.चि. 1/133)

Protective rites should be performed for the safety of the wounded patient from the influences of malignant star and spirits with the major and minor duties i.e. Yama and Niyama enjoined to be practiced on his behalf.

..... यमनियमाभ्यामात्मानं संयोज्यवाग्यतोऽभ्यन्तरः ।
(सु.उ. 30/10)

At the time of use of Soma one should then wash and rinse his mouth with water in the manner of Acahmana. The having controlled his mind and speech with the vows of Yama and Tiyama he should stay in the protected inner chamber surrounded by his friends.

हिंसास्तेयान्यथाकाम पैशुन्यं पारुशानृते ।
सम्भिन्नालापं व्यापादमभिध्यां दृग्विपर्ययम ॥
पापं कर्मेति दशधा कायवाकमानसैस्त्यजेत ।
(अ.ह.सू. 2/21-22)

Vagbhatacharya explained in Dinacharya Himsa, Asteya, Anyathakama, Paishunyam, Parushanrute, Sambhinnaalapam, Vyapada, Abhidhya, Drugvipa-ryaya, Papakarma. These Dasha Papakarma should not be borne the body, mind and speech.

Food of all especially of kings should be observed strictly because Yoga and Kshema is by the king. Dharma, Artha, Karma and Moksha are connected with Yoga and Kshema (A. H. S.).

Those who know the subject without the means advocated Tapa or unmethodically performing Yoga may die sure (A.H.S.).

व्यजेदाक्ष्मनाशाश्च प्राणायामं च कारयेत ।
पृष्टपार्श्वोदरं मृजात करैरुष्णैरधोमुखम ।
(अ.ह.क. 5/13)

Vagbhatacharya explain at the time of treating Murcha one should wet the face with cold water up to removal of back side use fan then, Pranayama then rubbing of back side and abdomen should be performed. When by any means neck is pressed and eyes going inside the use Vamana, Kshavathu and Pranayama should be performed.

Moksha, Muktatma Lakshana and Upaya

Moksha also called Vimoksha, Vimukti and Mukti, means emancipation, liberation or release. The deeper meaning of Moksha in Hinduism simply means liberation of the Atman soul from the cycle of birth and death forever. The moment human beings reached the stage of enlightenment (Kaivalya Jnana), one finally gained Moksha (salvation) in that lifetime.

योगे मोक्षे च सर्वासां वेदनामवर्तनम ।
मोक्षो निवृत्तिर्निःशेषा योगो मोक्षप्रवर्तकः ॥
(च.शा. 1/137)

Recurrence of all sensation is blocked through Yoga and Moksha. The absolute eradication of

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sensation is attained through Moksha. The Yoga is a means to attain Moksha.

आत्मेन्द्रियमनोर्थानां सन्निकर्षात प्रवर्तते ।
सुखदुःखमनारम्भादात्मस्थे मनसि स्थिरे ॥
निवर्तते तदुभयं वशित्वं चोपजायते ।
सशरिरस्य योगज्ञास्तं योगमृषयो विदुः ॥
(च.शा. 1/138-139)

Happiness and Miseries are felt due the contact of the soul, the sense organs, mind and the objects of senses. Both these types of sensations disappear when the mind is concentrated and contained in the soul and the super-natural power in the mind and body re attained. This state is known as Yoga according to sages well versed in Ayurveda.

मोक्षो रजस्तमोऽभावात बलवत्कर्मसंक्षयात ।
वियोग सर्वसंयोगैरपुनर्भव उच्यते ॥
(च.शा. 1/42)

Moksha is nothing but an absolute detachment of all contacts by virtue of the absence of Rajas and Tamas in the mind and annihilation of effects of potent past actions. This is a state after which there are no more physical and mental contacts.

Moksha Upaya

सतामुपासनं सम्यगसतां परिवर्जनम ।
व्रतचर्योपवासौ चनियमाश्च पृथग्विधाः ॥
धारनं धर्मशास्त्राणां विज्ञानं विज्ञने रति ।
विषयेष्वरतिर्मोक्षे व्यवसायः परा धृतिः ॥
कर्मणामसमारम्भः कृतानां च परिक्षयः ।
नैष्कम्यमनहकारः संयोगे भयदर्शनम ॥
मनोबुद्धि समाधानमर्थतत्व परिक्षणम ।
तत्त्वस्मृते सर्वमेतत् प्रवर्तते ॥
(च.शा. 1/43-146)

1. Devotion to noble souls
2. Abandoning company of the bad persons
3. Performa Vrata, Upavasa and Niyama
4. Follow the rules of good conduct
5. Compliance with scriptural prescriptions
6. Scriptural knowledge
7. Liking for lonely, living
8. Detachment from the objects of senses
9. Striving for Moksha
10. Absolute mental control
11. Abstinence from the performance of acts leading to good and sinful effects
12. Annihilation of the effects of past- actions
13. Desire to get away from the wordily tarp
14. Absence of ego.
15. Concentration of mind, body and soul
16. Thinking and remembering about spiritual objects
17. Absence of desires is means to Salvation.

Eight super (Natural power of Yogi)

आवेशश्चेतसो ज्ञानमर्थानां छन्दतः क्रिया ।
दृष्टिः श्रोत्रं स्मृतिः कान्तिरिष्टतश्चाप्यदर्शनम ॥
इत्यष्टविधमाख्यातं योगिनां बलमैश्वरम ।
शुद्धसत्वसमाधानात्तत सर्वमुपाजयते ॥
(च.शा. 1/140-141)

1. Entering others body
2. Thought reading
3. Doing things at will
4. Super-natural vision
5. Supernatural audition
6. Miraculous memory
7. Uncommon brilliance
8. Invisibility when desired. These are the eight super Natural powers attained by those practicing Yoga.

Ashta Aishwarya(Eight Supernormal Powers)

Ashta-Siddhis means eight types of supernormal powers. The eight supernormal powers or faculties innate in man but at present generally latent or undeveloped, although attainable when a person reaches the status of a Buddha.

Ashta Siddhis or the eight powers are possessed by yogis or Siddhas (perfect beings). These supernormal powers are believed attained, by the practice of yoga. The Ashta Siddhis are

1. Anima- capability of making the body minute
2. Mahima- increasing body size,
3. Laghima-ability to become light
4. Garima- power to make the body heavy,

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5. Ishitva- possess divine powers,
6. Vashitwam- power to attract and bring others under control
7. Prapti- power to secure anything
8. Prakamya- ability to become invisible

Satyabuddhi

सर्वं कारनवद्दुःखमस्वं चानित्यमेव च।
न चात्मकृतकं तद्धि तत्र चोत्पद्यते स्वता॥
यावन्नोत्पद्यते सत्या बुद्धिनैतदहं यथा।
नैतन्ममेति विज्ञाय ज्ञः सर्वमतिवर्तते॥

(च.शा. 1/152-153)

Any things that has a cause constitutes misery, it is alien and ephemeral. It is not produced by the soul but ne has got a feeling of its ownerships until one has got a real knowledge to the effect that this is something different from him; and is not his own. As soon as one knows it, he gets rid of all miseries.

Muktama Lakshana

तस्मिश्चरमसंन्यासे समूलाः सर्ववेदनाः।
ससंज्ञाज्ञान विज्ञाना निवृत्ति यान्त्यशेषतः॥

(च.शा. 1/154)

अतः परं ब्रह्मभूतो भूतात्मा नोपलभ्यते।
निःसृतः सर्वभावेभ्यश्चिन्हं यस्य न विद्यते॥
ज्ञानं ब्रह्मविदां चात्र नाज्ञस्तज्ज्ञातुमर्हति॥

(च.शा. 1/155)

Final renunciation in respect of all subsequent actions is attained; the very consciousness together with its final causes in the form of indeterminate, determinate or scriptural knowledge is completely eradicated. One identifies himself with Brahman and the emprirical soul ceases to exist. He is easily distinguishable from all other manifestations. He does not leave any indication of his existence. This is what those well versed in the knowledge of Brahman say.

नात्मनः करणाभवल्लिङ्गमप्युपलभ्यते।
स सर्वकरणायोगान्मुक्त इत्याभिधीयते॥

(च.शा. 5/22)

It is not possible even to characterize the liberated soul. For he has no contact what over with mental or other sense faculties. So, being detached of all sensory contacts, he is considered to be a liberated Soul.

Tatwasmriti

एतत्तदेकमयनं मुक्तैर्मोक्षस्य दर्शितम।
तत्त्वस्मृति बलं, येन गता न पुनरागताः॥
अयनं पुनराख्यामेतद्योगस्य योगिभिः।
संख्यातधर्मैः सांख्यैश्च मुक्तैर्मोक्षस्य चायनम॥

(च.शा. 1/150-151)

The power of metaphysical memory constitutes the best way of libration, as shown by the liberally ones. Persons following this way do not come back to worldly tarps. This is again the best way to the attainment of Yoga as well as Moksha. This is what the Yogis, the virtuous ones, the followers of the Samkhya system, and the libration ones say.

Naishthiki Chikitsa

Ayurveda has always emphasized the importance of treating the mental aspects for complete relief. Accordingly various treatment modalities are mentioned to keep the patient's mind healthy by maintaining the balance between the Manas Doshas. Satva, Raja and Tama are considered the Manas Dosha amongst which one should aim at developing the Satva Guna as it can help to keep our mind stable. Increase in Raja Guna leads to disturbed coordination of mind and body and causing unnecessary thinking. Increase in Tama Guna makes one lethargic and non enthusiastic thereby generating negative thoughts in his mind.

Thus Naishthki Chikitsa helps to increase the good qualities of Mana(Mind) which is also called as Satva. Hence this treatment is also termed as Sattvavajaya Chikitsa.

.... चिकित्सा तु नैष्ठोकी या विनोपधाम।
उपधा हि परो हेतु र्दुःख दुःखाश्रयप्रदः।
त्यागः सर्वोपधानां च सर्वदुःकव्यपोहकः।
कोपकारो यथा ह्यंशूनुपादत्ते वधप्रधान।
उपादत्ते यथाऽर्थेभ्यस्तृष्णामज्ञः सदाऽतुरः।
यस्त्वग्निकल्पानर्थांञ्च ज्ञो ज्ञात्वा तेभ्यो निवर्तते।
अनारम्भाद संयोगस्य दुःख नोपतिष्ठते।

(च.शा. 1/94-97)

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Nisththika Chikitsa means Upadharahita, as Upadha is the root cause of all miseries. Elimination of desires, leads to the eradication of all miseries. A silk warm provides for itself suicidal threads. So does an ignorant person, bound with worldly miseries, provides for himself desires arising out of the various objects. A wise person, who abstains from the objects of senses, considering them as dangerous as burning fire, does not subject himself to any wishful acts and contacts with their objects with the result that miseries never overcome him.

According to Charakacharya Hetu (cause), Utapatti (birth), Vriddhi (growth), Upaplava (decay) and Viyoga (dissolution) of the natural state. His attachment to the various actions constitutes a causative factor of all his miseries and detachment of cessation of all miseries. Satyabuddhi of the fact that attachment leads to miseries and detachment to happiness is the real knowledge. This knowledge can be achieved only by virtue of the realization of the identity of the universe and man.

Pravritti (Cause of attachment) (Ref- Cha. Sha. 5/9)

Attachment is caused by Ahankara, Sanga, Samshaya, Abhisamplava, Abhyavapata, Vipratyaya, Avishesha, and Anupaya arising from attachment overcome and engulf and individual as the trees with very long branches overcome and engulf a young tree.

Ahankara- represents an egoistic feeling, such as I am endowed with best, descent, beauty, wealth, character, intelligence, conduct, learning, locality, age, potency and influence.

Sanga- represents that mental, vocal or bodily action which is not conducive to the attainment of salvation.

Samshaya- stands for doubt regarding the existence of the result of the past action, salvation, life after death etc.

Abhisamplava- stands for vanity, I am second to none in any situation, I am the creator; I am an accomplished person by nature; I am in the excellent state of the health, sense organs, intelligence and memory.

Abhyavapata- attachment of mother, father, brother, wife, progeny, keen, friends and servants to me and I belong to them.

Vipratyaya- when a person considers desirable, beneficial things as harmful and an auspicious one as inauspicious called as Vipratyaya.

Avishesha- lack of distinction between a conscious and an unconscious element, nature and its modifications, attachment and detachment is Avishesha.

Anupaya- actins like Prokshana (consecration), Anasana (fasting), Agnihotra,Trisevana (three Oma libations), Abhyukshana (wetting), Anahana (invocation), Yajana (priesthood), Yacana (bagging), and entering into water and fire are known as Anupaya.

Nivutti (method of detachment)

निवृत्तिरपवर्गः तत परं प्रशान्तं तत्तदक्षरं ततब्रह्मं स मोक्षः ।
(च.शा. 5/12)

Detachment is salvation. It is Para (absolute). It is Parashant. It is Akshara. It is Brahma. It is Moksha (salvation).

Therapeutic Index

Abdomen : (General Toning and Strengthening)

Asana: General- Pawanmuktasana, Sputa Vajrasana, Shashankasana, Ushtrasana, Trikonasana, Matsyasana, any backward or forward bending asana, ardha Matsyendrasana, Halasana, Mayurasana, Paschimottanasana.

Pranayama: Bhastrika, Kapalbhati.

Bandha: Uddiyana Bandha.

Shatkarma: Agnisar Kriya, Nauli, Shankhaprakshalana, Kunjal.

Acidity

Asana: Vajrasana for at least 10 minutes after every meal.

Pranayama: Nadi Shodhana, Bhramari.

Shatkarma: Agnisara Kriya, Kunjal.

Other: Relaxation and cultivation of mental tranquillity through yoga Nidra and meditation.

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Adenoids: (Enlargement)

Asana: Simhasana, Surya Namaskara.

Pranayama: Ujjayi with Khechari Mudra.

Shatkarma: Neti, Kunjal.

Diet: Avoid non-vegetarian food, milk products and sour food.

Adrenal Glands: (General Toning)

Asana: General - Surya Namaskara, Bhujangasana, Ushtrasana, Trikonasana, Dhanurasana, Shalabhasana, Paschimottanasana, Chakrasana, Padahastasana, Ardha Matsyendrasana, Halasana, Merudandasana, Mayurasana,

Pranayama: Bhastrika.

Mudra: Pashinee Mudra.

Bandha: Uddiyana Bandha.

Shatkarma: Agnisara Kriya, Nauli.

Other: Stress free, regular lifestyle.

Anaemia

Asana: Surya Namaskara, Bhujangasana, Shalabhasana, Sarvangasana, Halasana, Matsyasana, Paschimottanasana.

Pranayama: Nadi Shodhana, Shitali, Sitkari, Ujjayi in Shavasana (without Khechari).

Diet: Rich in green leafy vegetables and fresh fruits.

Anxiety: (And Nervous Tension)

Asana: General-Pawanmuktasana, Suryanamaskara, Shashankasana, Yoga-mudra-sana, Paschimottanasana, Bhujangasana, Shalabhasana, Sarvangasana, Halasana, Shavasana.

Advanced : Garbhasana, Koormasana.

Pranayama : Nadi Shodhana, Kapalabati, Bhastrika, Bhramari, Sheetali, Seetkari.

Mudra: Vipareeta Karani, Pashinee, Shambhavi, Bhoochari, yoga, Prana and yoni Mudras.

Shatkarma: Trataka, Jala Neti, Kunjal.

Appetite

Asana: Forward and backward bends, Surya Namaskara.

Pranayama: Agnisar Kriya.

Bandha: Uddiyana Bandha.

Shatkarma: Nauli.

Arthritis

Asana: pawanmuktasana

Pranayama: Nadi Shodhana, deep abdominal breathing, Bhramari, Kapalabhati.

Diet: Light veg. meals, avoid sour and artificial food.

Shatkarma: Neti, Kunjal, Laghoo Shankhaprakshalana.

Other: Yoga Nidra, meditation.

Asthma

Asana : Surya Namaskara, Shashankasana, Pranamasana, Sarvangasana, Supta Vajrasana, Marjari-asana, Ushtrasana, Hasta Uttanasana, Utthita lolasana, Dwikona-sana, Matsyasana, backward bending Asanas, Padahastasana, Baddha Padmasana.

Shavasana with breath awareness.

Pranayama: Nadi Shodhana, Bhastrika, Kapalbhati. Deep abdominal breathing at all times.

Shatkarma: Vastra Dhouti, Shankhaprakshalana, Kunjal, Jala Neti.

Diet: Avoid mucus producing foods such as milk and milk products, rice and non-vegetarian foods. Eat fruit and vegetables in season, and cooked, rather than raw vegetables (salads) especially in winter.

Other: Yoga Nidra, Ajapa Japa, Antar Mouna and other meditation and relaxation techniques to remove the source of nervousness.

Backache

Asana: Pawanmuktasana and Supta Vajrasana, Shashankasana, Bhujangasana, Vyaghrasana, Tadasana, Tiryaka Tadasana, katichakrasana, Makarasana, all backward bending Asanas, Meru Wakrasana, Bhunamanasana.

Pranayama: Ujjayi, Bhramari.

Diet: Light vegetarian diet.

Cold or Cough

Asana: Surya Namaskara, regular practice of Asanas and Pranayama. Simhasana is especially

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recommended. During a cold only relaxing practices should be attempted.

Shatkarma: Neti, Kunjal, Laghoo Shankhaprakshalana.

Diet: Avoid mucus-producing foods such as milk and milk products, rice and non-vegetarian foods.

Constipation

Asana : Tadasana, Tiryaka Tadasana, Katichakrasana, Surya Namaskara, Pawanmuktasana, sputa Vajrasana, Shashankasana, Ushtrasana, Trikonasana, Yogamudrasana, Matsyasana, all backward and forward bending Asanas, all spinal twist Asanas, Halasana.

Drink 2 to 3 glasses of body temperature warm water before morning practice.

Sit in Vajrasana for at least 10 minutes after every meal.

Pranayama : Nadi Shodhana.

Mudra : Ashwini Mudra.

Bandha : Uddiyana and Maha Bandhas.

Shatkarma: Laghoo Shankhaprakshalana, Agnisara Kriya, Nauli.

Diet: Fresh fruit, vegetables and drink plenty of water.

Diabetes

Asana: General - Surya Namaskara, Tadasana, Yogamudrasana, Shashankasana, Supta Vajrasana, Paschimottanasana, Bhujangasana, Ardhamatsyendrasana, Halasana, Sarvangasana, Matsyasana, Gomukhasana, Shavasana.

Advanced : Dwihasta Bhujangasana, Vatayanasana.

Pranayama : Nadi Shodhana, Bhramari, Bhastrika, Ujjayi.

Shatkarma : Laghoo Shankhaprakshalana, Kunjal, Neti.

Diet: Food restrictions should be followed.

Headache: (Also Migraine)

Asana: Relaxation poses, Pawanmuktasana, eye exercise, Shashankasana, Tadasana, Dwikonasana.

Pranayama: Nadi Shodhana, Bhramari, Ujjayi

Shatkarma: Neti (Kunjal for migraine).

Precautions: Avoid eye strain.

Other: Yoga Nidra.

Impotence

Asana: Pawanmuktasana, Surya Namaskara, Sarvangasana, Halasana.

Pranayama: Nadi Shodhana, Bhastrika, Ujjayi.

Bandha: Moola Bandha.

Mudra: Vajroli, Ashwini Mudras.

Insomnia

Asana: Pawanmuktasana , Shashankasana.

Pranayama: Bhramari, Ujjayi, abdominal breathing in Shavasana before going to sleep.

Shatkarma: Trataka.

Other: Yoga Nidra before sleep.

Obesity

Asana: Pawanmuktasana, Vajrasana, Surya Namaskara, Padahastasana, Halasana, Vipareeta Karani Asana, Matsyasana.

Pranayama: All Pranayamas, especially Bhastrika, Sheetali or Seetkari.

Diet: Avoid oily, fried or starchy foods, oscillating between fasting and overeating, eating between meals.

Piles

Asana: Sarvangasana or Vipareeta Karani asana for extended periods, Ashwini Mudra or Moolabandha while in the inverted position, Pawanmuktasana, Tadasana, Tiryaka Tadasana, Katichakrasana, Shashankasana, Shashank Bhujangasana, Supta Vajrasana, Ushtrasana, Matsyasana, Paschimottanasana.

Mudra: Ashwini Mudra for extended periods.

Shatkarma: Laghoo Shankhaprakshalana, Moola Shodhanam.

Diet: Light, easily digestible food such as fresh fruit and vegetables. Drink plenty of water, fruit and vegetable juice, herbal teas. Avoid heavy foods

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like meat, cheese, fried or oily food, rich sauces, and desserts.

Pregnancy : (Antenatal) and Reproductive Organs : (General Toning - Male and Female)

Asana : Months 1 To 3

General - Pawanmuktasana and Surya Namaskara, Shashankasana, Marjariasana, Shashank Bhujangasana, Ushtrasana, Vyaghrasana, Kati Chakrasana, Tadasana, Meru Prishthasana, Utthanasana, Trikonasana, Yogamudrasana, Matsyasana, Tolangulasana, all backward bending Asanas, Ardhamatsyendrasana, inverted Asanas, Kandharasana, Garudasana, Vashishthasana, Pada Angushthasana.

Advanced : Moolabandhasana, Dhanurakarshanasana, Hanumanasana.

Males : Mayurasana, Brahmacharyasana.

Pranayama : All Pranayamas.

Mudra : Ashwini, Vajroli, Vipareeta Karani, Maha and Maha Bheda Mudras.

Bandha : Moola and Maha Bandhas.

Shatkarma : Agnisar Kriya, Nauli.

Other : Yoga Nidra, meditation.

Months 4 to 6 - Pawanmuktasana, Matsyakridasana, meditation Asanas, Vajrasana, Bhadrasana, Majariasana, Hasta Utthanasana, Tadasana, Tiryakatadasana, Kati Chakrasana, Utthanasana.

Months 7 to 9 - Only Pawanmuktasana.

Pranayama: Nadi Shodhana, Bhramari, Ujjayi, light Bhastrika. After 3 months discontinue Bhastrika.

Mudra: Ashwini and Vajroli Mudras.

Bandha: Moola Bandha.

Diet: Nutritious, vegetarian diet.

Shatkarma: Kunjal to relieve morning sickness, After 3 months only do Neti.

Other: Yoga Nidra, Ajapa Japa and meditation.

Precautions: Avoid Uddiyana Bandha, Agnisara Kriya and Nauli. Take special care not to strain.

Pregnancy: (postnatal)

Asana: Week 1 - Relaxation Asanas.

Week 2 - Add Pawanmuktasana

Week 3 - Add Pawanmuktasana, Standing Asana, backward bends, spinal twists.

Week 4 - Emphasise Pawanmuktasana, Addutthanasana and slow Surya Namaskara.

Pranayama: Week 2 onwards - Nadi Shodhana, Bhramari, Ujjayi, gentle Bhastrika.

Mudra: Week 3 onwards - Ashwini and Vajroli Mudras.

Bandha: Week 3 onwards - Moola Bandha.

Other: Week 1 on - Yoga Nidra, Ajapa Japa, meditation.

Importance of International Day of Yoga (IDY)

The Indian Prime Minister Narendra Modi, in his UN address in 2014, suggested an annual Day of Yoga on June 21, as it is the longest day of the year in the Northern Hemisphere and shares a special significance in many parts of the world.

The International Day of Yoga (IDY) is celebrated on June 21st each year and was established by the United Nations General Assembly in 2014. This day holds significant importance for several reasons:

1. Promotion of Health and Well-being: Yoga is a holistic approach to physical and mental well-being. IDY encourages people to incorporate yoga into their daily lives, promoting a healthier lifestyle by emphasizing physical fitness, mental health, and spiritual well-being.
2. Stress Reduction: The practice of yoga includes various relaxation and meditation techniques, which are essential for managing stress. IDY raises awareness about the benefits of these techniques in reducing stress and improving mental health.
3. Cultural Exchange: Yoga has its roots in ancient Indian culture, and IDY provides an opportunity for people from different cultures

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and backgrounds to come together and learn about this rich tradition. It promotes cultural exchange and understanding.

4. International Unity: The celebration of IDY transcends borders and brings people from all over the world together. It is a day to celebrate the unity of humanity and the interconnectedness of all living beings.
5. Environmental Awareness: Many yoga practitioners emphasize the importance of environmental consciousness and sustainability. IDY often includes events and discussions that highlight the connection between yoga and environmental conservation.
6. Spiritual Growth: For many, yoga is not just a physical exercise but a path to spiritual growth and self-realization. IDY encourages individuals to explore the spiritual aspects of yoga and develop a deeper understanding of themselves and their place in the world.
7. Preventive Healthcare: Yoga is considered a preventive healthcare measure, as it helps in maintaining a healthy body and mind, reducing the risk of various diseases and health issues. IDY raises awareness about the preventive aspect of yoga.
8. Inclusivity: Yoga is a practice that can be adapted to suit people of all ages and physical abilities. IDY promotes inclusivity by making yoga accessible to a wide range of people, regardless of their physical condition or background.
9. Government and Policy Support: Many governments recognize the importance of yoga and use IDY as an opportunity to promote policies and initiatives that support the practice of yoga in their countries.
10. Global Peace and Harmony: Yoga philosophy promotes peace, compassion, and harmony. By celebrating IDY, there is an emphasis on these values as a means to achieve global peace and understanding.

The International Day of Yoga is important for promoting physical and mental well-being, fostering international unity and cultural exchange, and raising awareness about the many benefits of yoga, both on an individual and a societal level. It serves as a reminder of the ancient wisdom of yoga and its relevance in our modern, fast-paced world.

Adverse Effects of Improper Yoga Practices

Yoga is a practice that offers numerous physical, mental, and spiritual benefits when done correctly and under the guidance of a qualified instructor. However, improper yoga practices can lead to a range of adverse effects, both short-term and long-term. Some of these adverse effects include:

1. **Physical Injuries**: Overstretching, poor alignment, or attempting advanced poses without proper preparation can lead to injuries. Common injuries include strained muscles, torn ligaments, and joint issues.
2. **Muscle Pain and Soreness**: If push yourself too hard or perform poses incorrectly, it can result in muscle pain and soreness.
3. **Joint Problems**: Yoga involves a lot of weight-bearing on the joints. Incorrect alignment or excessive stress on the joints can lead to issues like arthritis or cartilage damage.
4. **Spinal Problems**: Poor alignment and improper technique can lead to back and neck issues, including herniated discs or sciatica.
5. **Nerve Damage**: Extreme poses or aggressive stretches can compress nerves, leading to pain and numbness.
6. **Breathing Problems**: Incorrect breathing techniques or excessive breath control can lead to dizziness, hyperventilation, or fainting.
7. **Psychological Stress**: Yoga is supposed to reduce stress, but improper practice, over-ambitious goals, and self-judgment can lead to increased stress and anxiety.
8. **Digestive Issues**: Certain yoga poses can put pressure on the abdominal area, potentially leading to digestive problems if practiced incorrectly.

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9. **Psychological and Emotional Stress**: Pushing oneself too hard or comparing oneself to others can lead to emotional stress and negative self-perception.
10. **Orthopedic Issues**: Prolonged or improper yoga practice can affect posture and musculoskeletal alignment, potentially leading to orthopedic issues.
11. **Cardiovascular Problems**: Holding poses for extended periods without proper preparation can lead to changes in blood pressure and heart rate, which may be problematic for individuals with certain medical conditions.
12. **Circulatory Problems**: Inversions and poses that constrict blood flow to the extremities can lead to circulatory problems.
13. **Psychiatric Issues**: In rare cases, intense meditation or breathing exercises can exacerbate underlying psychological conditions, such as anxiety or depression.

To avoid these adverse effects, it's essential to practice yoga mindfully, with proper instruction, and listen to your body. Always start with the basics and progress gradually. Yoga is about balance, both physically and mentally, so it's important to approach it with patience and awareness.

MCQ on Yoga

1. Oldest text book of yoga
   A) Raja yoga B) yoga sutra
   C) yogasamhitha D) Karma yoga
2. Yoga sutra has parts
   A) Three B) Two
   C) Four D) Five
3. The first part of yoga sutra deals with———
   A) Samadhi B) Niyam
   C)Asana D) Yama
4. Yoga sutra written by———
   A) Patanjali B) Kanada
   C) Kapila D) Yogi
5. The fourth part of yoga practice aims at——
   A) Heaven B) Liberation
   C) Purification D) Satisfaction
6. Kaivalyapada means———
   A) Purification B) Sthidi
   C) Liberation D) Peace of mind
7. The second part of yoga sutra explains——
   A) Sadhanapada B) Cittapada
   C) Namapada D) None the above
8. Vibhutipada means———
   A) Power B) Weakness
   C) Super normal power D) Pleasure
9. The founder of yoga system———
   A) Kapila B) Jaimini
   C)Patanjali D)Yogacharya
10. Yoga sutra is the———
    A) Oldestbook B) Interpretation
    C) Modernbook
    D) New version of yoga
11. The statement 'Yogasutra has five parts' is—
    A) True B) False
    C) Undetermined D) None the above
12. Samadhi is explained in the part of yoga
    A) First part B) Second part
    C) Third part D) Fourth part
13. Sadhanapada is in part of yoga
    A) First part B) Second part
    C) Third part D) Fourth part
14. Kaivalyapada is in part of yoga
    A) First part B) Second part
    C) Third part D) Fourth part
15. Vibhutipada is in part of yoga
    A) First B) Second
    C) Third D) Fourth
16. Liberation is described in the part of yoga
    A) First B) Second
    C) Third D) Fourth
17. The means of attaining Samadhi is described in part
    A) First part B) Second part
    C) Third part D) Fourth part
18. Yoga means———
    A) Relationship B) Union
    C) Attachment D) None the above

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19. The power of concentration is possible through———
A) Viyoga B) Yoga
C) Sadhana D) Asana

20. Meditation is a necessary condition of———
A) Yoga B) Dhyana
C) Dharana D) Asana

21. The aim of yoga is separation between———
A) God and soul B) Body and mind
C) Purusha and pkriti D) Purusha and citta

22. Viyoga means———
A) Ignorance B) Desire
C) Separation D) Knowledge

23. Yoga is a methodical effort to attain———
A) Perfection B) Union
C) Enjoyment D) Discipline

24. The practice of yoga is meant for———
A) Physcical freedom
B) Spiritual freedom
C) Courage D) Pleasure

25 is dominated by citta
A) Sattva B) Tapas
C) Ahamkara D) Rajas

26. Vritti means———
A) Body concentration B) Neatness
C) Pleasure
D) Mental meditation

27. is an obstacle of concentration
A) Prakriti B) Purusha
C) Joyfulness D)egoism

28. Raga means ———
A) Attachment B) Sorrow
C) Misery D) Pleasure

29. Avidhya means ———
A) Ignorance B) Malobservation
C) Nonobservation D) None the aue

30. Abhinivesa means ———
A) Clinging to life B) Pleasure
C) Misery D) Desire

31. Yoga do not accept pramana
A) Anubalabti B) Pratyksha
C) Anumana D) Scripture

32. Yama means ———
A) Abstention B) Detachment
C) desire D) Body

33. Niyama means ———
A) Observance B) Abstention
C) detachment D) Desire

34. Yoga accepts as eight fold method
A) Niyama B) Vairagya
C)viparya D) Citta

35. Asana means ———
A) Posture B) Sleep
C) Play D) Breath

36. Pranayama means ———
A) Regulation of breath B) Posture
C) Sleep D) Dyana

37. Yoga accepts as eight fold path
A) Prathyahara B) Citta
C) Vritti D) Vikalpa

38. Prathyahara means ———
A) Withdrawal of senses B) Sleep
C) Dream D) Posture

39. Dhyana means ———
A) Concentration B) Abstention
C) Attachment D) Prayer

40. Contemplation means in Sanskrit
A) Dharana B) Dhyana
C) Samadhi D) Pratyahara

41. Which one is an eight fold method in Yoga?
A) Vikalpa B) Samadhi
C) Vritti D) Vinaya

42. Dhyana means ———
A) Abstention B) Attention
C) Contemplation D) Concentration

43. Which one is not eight links of Yoga?
A) Yama B) Niyama
C) Vicharana D) Pratyahara

44. Which one is not eight links of Yoga?
A) Asana B) Pranayama
C) Sadhana D) Yama

45. .....is direct aid of Yoga
A) Vrita B) Citta
C) Samadhi D) Yama

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46. Is indirect aid of Yoga
A) Samadhi B) Viparya
C) Yama D) Karma

47. is direct aid of Yoga
A) Niyama B. Asana
C) Dharana D. Pranayama

48. is direct aid of Yoga
A) Vikalpa B) Yama
C) Dhyana D) Posture

49. is indirect aid of Yoga
A) Samadhi B) Dhyana
C) Tapas D) Niyama

50. .....is indirect aid of Yoga
A) Dhyana B) Samadhi
C) Swapna D) Pranayama

51. Indirect aid of Yoga is _____
A) Sadhana B) Dharana
C) Dharma D) Niyama

52. Direct aid of Yoga is _____
A) Yama B) Niyama
C) Asana D) Dharana

53. Indirect aid of Yoga is _____
A) Sadhana B) Samadhi
C) Dhyana D) Asana

54. Antaranga means _____
A) External aid B) Manas
C) Self D) Internal aid

55. Bahiranga means _____
A) Internal aid B) body
C) Ahankra D) External aid

56. is Bahiranga
A) Samadhi B) Dhyana
C) Upadhi C) Yama

57. is Antaranga
A) Yama B) Niyama
C) Samadhi D) Asana

58. is Antaranga
A) Upasana B) Asana
C) Dhyana D) Vrita

59 .....is Antaranga
A) Niyama B) Mind
C) Dharana D) Dharma

60. is Bhahyaranga
A) Manas B) Ahankara
C) Niyama D) Samadhi

61. is Bhahyaranga aid
A) Samadhi B) Dhyana
C) Asana D) Dhwani

62. is not Antaranga aid
A) Samadhi B) Dhyana
C) Chitta D) Dharana

63. is Bhahyaranga aid
A) Citta B) Vritti
C) Pranayama D) samadhi

64. is Bhahyaranga aid
A) Mind B) Body
C) Pratyahara D) Prakrti

65. Out of eight links of Yoga how many are direct
A) Four B) Eight
C) Three D) Two

66. Out of eight links of Yoga how many are indirect
A) Three B) Two
C) Five D) Four

67. Karma Yoga is related to _____
A) Jnana B) Bhkti
C) Work D) Silence

68. Bhakti Yoga is related to _____
A) Silence B) Jana
C) Devotion D) Work

69. Jnana Yoga is related to _____
A) Bhakthi B) Devotion
C) Wisdom D) Work

70. Work is related to _____
A) Jnana B) Bhakhi
C) Karma D) Selfishness

71. Devotion is related to _____
A) Work B) Jnana
C) Bhakti D) Karma

72. Wisdom is related to _____
A) Bhakthi B) Karma
C) Jnana D) Study

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73. Yama is _____
A) Physical Preperation B) Body
C) Ethical Preparation D) Mind

74. Niyama is _____
A) Body
B) Physical preparation
C) Ethical Preparation
D) Law

75. Yoga which one is for Ethical Preparation
A) Purusha B) Pranayama
C) Samadhi D) Yama

76. Yoga consider as Ethical Preparation
A) Sadhana B) Citta
C) Vritti D) Niyama

77. Yoga consider as Ethical Preparation
A) Purusha B) Prakrti
C) Sahana D) Yama

78. Find the odd one out
A) Yama B) Niyama
C) Asana D) Ahimsa

79. is not eight fold method
A) Yama B) Niyama
C) Asana D) Vrita

80. Find the odd one out
A) Dhyana B) Dharana
C) Samadhi D) Antaranga

81. is not Eight fold method
A) Yama B) Niyama
C) Ahimsa D) Satya

82. Practice of Ahimsa is _____
A) Ethical Preparation
B) Physical preparation
C) Purification D) Nothingings

83. Ahimsa is a part of _____
A) Yama B) Samadhi
C) Himsa D) Dharana

84. Devotion to God is a part of _____
A) Yama B) Tapas
C) Vikalpa D) Amadhi

85. Devotion to God is a Niyama
A) True B) False
C) Not known D) None the above

86. Tapas is related to _____
A) Niyama B) Yama
C) Citta D) Devotion

87. Asana is
A) Physical Concentration
B) Mental concentration
C) Concentration D) Desire

88. Physical activity is related to _____
A) Asana B) Dhyana
C) Dharana D) Samadhi

89. Asana is meant for _____
A) Discipline of the body B)Aoul
C) Purusha D)prakrti

90. is an important part in Hatayoga
A) Breath Control B) Soul
C) Body D) Purusha

91. Hatayoga emphasis _____
A) Breath Control B) Body control
C) Physical control D) Prakrti

92. Breath Control influences _____
A) Mind B) Body
C) Soul D) Purusha

93. Dharana is fixing the in particular spot
A Mind B) Body
C) Soul D) Posture

94. is fixing the mind in a particular spot
A) Dharana B) Yama
C) Soul D) Body

95. Citta can be fixed in a particular spot by ____
A) Dharana B) Thinking
C) Sankalpa D) Yama

96. Dharana help us to fix our in a particular spot
A) Citta B) Body
C) Purusha D) Prakriti

97. Dhyana culminates in _____
A) Samadhi B) Vritti
C) Citta D) Upalabthi

98. Vichara means _____
A) Meditation B) Reflection
C) Action D) Doubt

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99. Ananda means ———
A) Devotion B) Joy
C) Misery D) Attachment

100. Freedom in Yoga is ———
A) Samadhi B) Kaivalya
C) Citta D) Vrita

101. is the freedom in Yoga
A) Sadhana B) Kaivalya
C) Yama D) Niyama

102. Kaivalya means ———
A) Boundage B) Freedom
C) Samadhi D) Pleasure

103. Kaivalya is the eternal life of ———
A) Man B) Purusha
C) Soul D) Citta

104. Guna means ———
A) Medium B) Quality
C) Quanty D) None the above

105. Yoga of action means ———
A) Bhakti B) Kriya Yoga
C) Jnana D) Inaction

106. Kriya Yoga means ———
A) Devotion B) Yoga of action
C) God worship D) Pleasure

Answers of MCQ on Yoga

1. B	19. B	37. A	55. D	73. C	91. A
2. C	20. A	38. A	56. C	74. C	92. A
3. A	21. C	39. A	57. C	75. D	93. A
4. A	22. C	40. A	58. C	76. D	94. A
5. B	23. A	41. B	59. C	77. D	95. A
6. C	24. B	42. B	60. C	78. D	96. A
7. A	25. D	43. C	61. C	79. D	97. A
8. C	26. D	44. C	62. C	80. D	98. B
9. C	27. D	45. C	63. C	81. C	99. B
10. A	28. A	46. C	64. C	82. A	100. B
11. D	29. A	47. C	65. C	83. A	101. B
12. A	30. A	48. C	66. C	84. A	102. B
13. B	31. A	49. D	67. C	85. A	103. B
14. D	32. A	50. D	68. C	86. A	104. B
15. C	33. B	51. D	69. C	87. A	105. B
16. D	34. A	52. D	70. C	88. A	106. B
17. A	35. A	53. D	71. C	89. A	
18. B	36. A	54. D	72. C	90. A	

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Chapter 10

Naturopathy

Syllabus

Basic principles of Naturopathy. Concept of Panchabhutopasana. Therapeutic effects of Mud therapy. Therapeutic effects of Sun bath. Fasting therapy - its types and benefits. Hydrotherapy - types of water used based on the temperature and therapeutic effects of Hydrotherapy. Therapeutic effects of Massage

Learning objectives

1. Explain the basic principles of Naturopathy
2. Describe the concept of Panchabhutopasana.
3. Explain the procedure and therapeutic effects of Mud therapy.
4. Explain the procedure and therapeutic benefits of Sun bath.
5. Explain Fasting therapy and its types and benefits.
6. Explain hydrotherapy, types of water used based on the temperature and therapeutic effects of Hydrotherapy.
7. Describe types, methods and benefits of massage.

Total - 9 hours (Lecture :05 hour, Non-lecture: 04 hours)
MCQ- Yes SAQ (5 Marks)- Yes LAQ (10 Marks)- No

Basic Principles of Naturopathy

Nature Cures, not the Physician - Hippocrates

Nature cure is a constructive method of treatment which aims at removing the basic cause of disease through the rational use of the elements freely available in nature. It is not only a system of healing, but also a way of life, in tune with the internal vital forces or natural elements comprising the human body. It is a complete revolution in the art and science of living.

Naturopathy is centuries old therapy; it is the healing power of nature. Naturopathy is a primary health care which emphasizes the prevention and treatment of disease, maintenances of optimal health and promotion of individual inherent self-healing process. Naturopathy includes all the available non-invasive treatment and diagnostic modalities which do not inference with the body's natural functional capacity and healing process.

"Health is wealth" health is not merely the absence of disease, but is a positive quality of living body. Human health and happiness are governed by the laws of nature, which should not be violated. Disease of acute nature is a vital response and the body has innate ability to care a disease which is known as vital power.

Naturopathy explains that the health can be promoted by eating well balanced diet rich in fruits and vegetables, regular exercise, maintenance of healthful weight and avoiding toxic habits like smoking, drug addiction etc. Naturopathy is one of the important branch of alternative medicine. The scope of naturopathic medicine in the field of clinical nutrition, homeopathy, botanical medicine, physical medicine, natural child health, counseling and stress management, also it covering all aspects of family health from prenatal through to geriatric care.

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The U.S. Department of Labor defines naturopathic physicians as doctors who "diagnose, treat, and help prevent diseases using a system of practice that is based on the natural healing capacity of individuals. May use physiological, psychological or mechanical methods. May also use natural medicines, prescription or legend drugs, foods, herbs, or other natural remedies."

Definition and derivation

Naturopathy, Naturopathic medicine, Nature cure, Nisargopachara these all synonymously used terminologies.

निसर्गोपचार-निसर्गोपचार is the combination of two words निसर्ग+उपचार

निसर्ग is an 'अ' कारान्त पुल्लिग शब्द, derived from नि and सृज धातु, घञ् प्रत्यय (वाचस्पति) means स्वभावतः

उपचार is an 'अ' कारान्त पुल्लिग शब्द, derived from उप् चर् धातु, घञ् प्रत्यय (वाचस्पति) means रुक् प्रतिक्रिया.

- Naturopathy-(na" cher-op'ah-the) A drugless system of healing by use of physical methods. (Dorland's medical dictionary)
- (Nature +o + pathy) A system of treating diseases, largely employing natural agencies such as air, water, sunshine etc and rejecting the use of drugs and medicine (New millennium 4th edition)
- The treatment of diseases etc. without drugs involving diet, exercise, massage etc (Oxford dictionary 3rd edition)
- The therapeutic living application of constrictive laws of nature is called Naturopathy (Dr. Henry Lindlahr).

Aims of Naturopathy

Naturopathy aims at educating people, for following healthier way of life & protects themselves against diseases by natural methods like Mud Therapy, hydrotherapy, fasting etc.

Development of naturopathy- The basic original idea of Nature cure is of Vedic origin in India where since antiquity was considered divine and all healing was attributed to the functions of nature. The original Hindus religion is really hall marked with the worship of Nature gods like Sun, Water, Air, and Earth. The man recognized the role of these natural forces in sustenance of life, hence a tradition of worship of nature gods became prevalent. Although the term 'naturopathy' is of relatively recent origin, the philosophical basis and several of the methods of nature cure treatments are ancient. It was practiced in ancient Egypt, Greece and Rome. Hippocrates, the father of medicine (460-357 B.C.) strongly advocated it. India, it appears, was much further advanced in older days in natural healing system than other countries of the world. There are references in India's ancient sacred books about the extensive use of nature's excellent healing agents such as air, earth, water and sun.

The Great Baths of the Indus Valley civilization as discovered at Mohenjo-Daro in old Sind testifies to the use of water for curative purposes in ancient India.

The modern methods of nature cure originated in Germany in 1822, when Vincent Priessnitz established the first hydropathic or 'water cure' (hydrotherapy) establishment there. With his great success in water cure, the idea of drugless healing spread throughout the civilized world and many medical practitioners throughout the civilized world and many medical practitioners from America and other countries became his enthusiastic students and disciples.

Water cure is synonymous with nature cure in those early days. The credit of making water cure world famous goes to Vincent Priestnitz (1799-1851). Dr. Henry Lindlahr and others go to the extent of crediting him as "father of naturopathy."

The word "Naturopathy" has been coined by Dr. John Scheel in the year 1895 and was propagated and popularized in western world by Dr. Benedict Just. A number of Doctors of modern medicine and others became nature cure enthusiasts and gradually added a number of modalities within the fold of naturopathy and scientifically developed them. Nature cure movement gained momentum in India as Mahatma Gandhiji (father of nation) became much interested in this system and included it in his programmers.

Nature cure is based on the realization that man

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is born healthy and strong and that he can stay as such as living in accordance with the laws of nature. Even if born with some inherited affliction, the individual can eliminate it by putting to the best use the natural agents of healing.Fresh air, sunshine, a proper diet, exercise, scientific relaxation, constructive thinking and the right mental attitude, along with prayer and meditation all play their part in keeping a sound mind in a sound body.

Principles and Practice of Nature Cure

The first and most basic principle of nature cure is that all forms of disease are due to the same cause, namely, the accumulations of waste materials and bodily refuse in the system.

These waste materials in the healthy individual are removed from the system through the organs of elimination. But in the diseased person, they are steadily piling up in the bodythrough years of faulty habits of living such as wrong feeding, improper care of the body and habits contributing to enervation and nervous exhaustion such as worry, overwork and excesses of all kinds. It follows from this basic principle that the only way to cure disease is to employ methods which will enable the system to throw off these toxic accumulations. All natural treatments are actually directed towards this end.

The second basic principle of nature cure is that all acute diseases such as fevers, colds, inflammations, digestive disturbances and skin eruptions are nothing more than self-initiated efforts on the part of the body to throw off the accumulated waste materials and that all chronic diseases such as heart disease, diabetes, rheumatism, asthma, kidney disorders, are the results of continued suppression of the acute diseases through harmful methods such as drugs, vaccines, narcotics and gland extracts.

The third principle of nature cure is that the body contains an elaborate healing mechanism which has the power to bring about a return to normal condition of health, provided right methods are employed to enable it to do so. In other words, the power to cure disease lies within the body itself and not in the hands of the doctor.

Nature Cure vs Modern System

The modern medical system treats the symptoms and suppresses the disease but does little to ascertain the real cause. Toxic drugs which may suppress or relieve some ailments usually have harmful side-effects. Drugs usually hinder the self-healing efforts of the body and make recovery more difficult. According to the late Sir William Osler, an eminent physician and surgeon, when drugs are used, the patient has to recover twice - once from the illness, andonce from the drug.

Drugs cannot cure diseases; disease continues. It is only its pattern that changes. Drugs also produce dietary deficiencies by destroying nutrients, using them up, and preventing their absorption. Moreover, the toxicity they produce occurs at a time when the body is least capable of coping with it. The power to restore health thus lies not in drugs,but in nature.

Methods of Nature Cure

The nature cure system aims at the readjustment of the human system from abnormal to normal conditions and functions, and adopts methods of cure which are in conformity with the constructive principles of nature. Such methods remove from the system the accumulation of toxic matter and poisons without in any way injuring the vital organs of the body. They also stimulate the organs of elimination and purification to better functioning. To cure disease, the first and foremost requirement is to regulate the diet.

To get rid of accumulated toxins and restore the equilibrium of the system, it is desirable to completely exclude acid-forming foods, including proteins, starches and fats, for a week or more and to confine the diet to fresh fruits which will disinfect the stomach and alimentary canal. If the body is overloaded with morbid matter, as in acute disease, a complete fast for a few days may be necessary for the elimination of toxins.

Principles of Naturopathy

1. All disease their cause and their treatment are one.
2. The basic cause of disease is not bacteria,

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bacteria develops after the accumulation of morbid matter when favourable atmosphere for their growth develops in body. Basic cause is morbid matter and not the bacteria.

3. Acute diseases are our friends not the enemies. Chronic diseases are the outcome of wrong treatment and suppression of the acute diseases.
4. Nature is the greatest healer. Body itself is having capacity to prevent from diseases and regain health if unhealthy.
5. Patient is treated and not the disease.
6. Long waiting for diagnosis is not required for treatment.
7. Patients suffering from the chronic aliments are also treated successfully in comparatively less time in naturopathy.
8. After emerging, suppressed diseases can be cured by naturopathy.
9. Naturopathy treats physical, mental, social and spiritual all four aspects at the same time.
10. Naturopathy treats body as a whole instead of giving treatment to each organ separately.
11. Naturopathy does not use medicines according to naturopathy "food is medicine."
12. According to Gandhi Rama Nama is best natural treatment means doing prayer ones spiritual faith is a important part of treatment.

Applied Principles of Naturopathic Medicine

- The healing power of nature
- Identify and treat the cause
- First do no harm
- Treat the whole person
- Nature as a physician, physician as a teacher
- Prevention

Concept of Panchabhutopasana

The material world is composed of five basic elements- ether, air, fire, water and earth. They represent the five fundamental qualities of matter. They are the physical moieties of all physical components of our body. Likewise, they constitute the biological assembly of the entire animal and plant kingdom besides the inanimate. Their presence in a prescribed balance is the basis of health and their imbalance forms a disease state. The transient imbalances in the body can be restored to balance by appropriate consumption of five elements from the nature following the law of Samanya and Vishesha i.e. homologous vs heterologous. Naturopathy believes that the five elements approach is two-fold, firstly the balancing of bodily five elements by supplementing or depleting them by extra-bodily through food, drug, life style as in Ayurveda. Secondly the five elements are also used in Naturopathy as purifying tools. According to naturopathy because of hypo functioning Agni and ingestion of unwanted materials from the polluted toxic materials get stagnated in the body. Because of their toxic and antigenic blocking effects those stagnated toxic materials produce different diseases. This is the main cause of disease in Nature cure tradition and hence removal of these toxins is the principle line of treatment. The principle medium and method of purification of stagnated toxins is through the five elements like water, air, light, mud etc. there is no better medium than water for cleansing. Similarly, there is nothing stronger than air and sunlight for drying and exhausting the impurities anywhere, in the body or elsewhere. Mud application is known to dissolve and adsorb the toxins and cleanse the body to make it pure. Hence all purifying therapies in naturopathy are comprised of water treatment, mud application and mud poultice, sun bath, air bathetic. Thus, the five elements are important and fundamental tools of treatment in Ayurveda and naturopathy.

Importance of Naturopathy in present era.

- Naturopathy is a science, which provides complete health with help of nature.
- Being a system without medicine
- It is free from side effects.
- It is safe for all.
- In Naturopathy patient's diet is his medicine.
- Naturopathy puts lot of emphasis on well balanced diet.

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- Naturopathy does not make one dependent on doctor. So one can learn the principles & follow them in their routine life to maintain health.

Naturopathy believes in the treating disease produced by nature by natural way. By utilizing five elements found in nature that is mud, water, sunlight, air, fasting and exercise. Another aspect is consumption of positive food, which is beneficial to health.

Therapeutic Effects of Mud Therapy

Mud is one of the five elements of nature having immense impact on the body in health as well as in sickness. It can be employed conveniently as a therapeutic agent in naturopathy treatment as its block colour absorbs all the colours of the sun and conveys them to the body.

Secondly as the mud retains moisture for a long time, when applied over the body part it causes cooling. Thirdly its shape and consistency can be changed easily by adding water. Moreover, it is cheap and easily available.

Earth was used extensively for remedial purposes in ancient times as well as the Middle Ages. In modern times, it again came into prominence as a valuable therapeutic agent in the last century through the indefatigable efforts of Emanuel Felke, a German-born Lutheran minister who was nicknamed the "Clay Pastor."

Felke found that the forces of earth have remarkable effects upon the human body, especially during the night. These effects are described as refreshing, invigorating and vitalizing. Felke believed that for wounds and skin diseases, application of clay or moistened earth was the only true natural bondage. The body is thus repaired with the element from which it is assumed to be made.

Adolf Just (1838 - 1936), one of the pioneers of nature cure in modern times, believed that all diseases, but especially the serious nervous troubles of our age, would lose their terrors, if only sleeping or lying on the earth at night became customary in the curing of diseases.

According to him, by sleeping on the ground, "the entire body is aroused from its lethargy to a new manifestation of vital energy, so that it can now effectively remove old morbid matter and masses of old faces from the intestines, and receive a sensation of new health, new life and new unthought-of of vigor and strength."

Types of soil

Mud found in different parts of the world has different properties. Mud composition varies with the place of origin. Firstly, a mineral constituent of mud varies with the kind of rocks found in the region and the process of soil formation. Secondly, mud property is influenced by kind of flora and fauna of the region.

Black mud: Dark cotton soil having some greasiness is suitable for mud therapy as it is rich in minerals and also retains water for long time. It should always be free from contamination and any kind of pollution.

Fango – Thermal mud of hot springs

Moor – Peat-based organic mud's.

Mud from Dead Sea: Cleopatra and Queen Sheeba used it for enhancing beauty; black mud of Dead Sea has beautifying and therapeutic powers. It is contains more than 20 kinds of salts and minerals including Magnesium, Calcium, Potassium Bromide, Silicates, Natural Tar and organic elements. While these beneficial minerals are useful for healing any kind of skin disorders, the presence of silicates make its masks very beneficial for softening and cleansing skin. The mud enhances blood circulation and leaves the skin with a glow.

Doctrine of mud selection

Mud procured for treatmentpurpose should be black cotton soil with greasiness and free from pollution and contamination. Before use mud should be dried, powdered and sieved to separate stones, grass particles and other impurities.

Mud therapy is used in two forms: Mud Pack and Mud Bath.

Mud Pack for Eyes: The pack is typically 9"x 6", enough to cover the eyes completely. It is placed

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on the eyes for 20 to 30 minutes. An eye mud pack helps in relaxing the eyes; especially good for those who require to sit in front of a computer for long hours. Therapeutically, it reduces irritation, itching, or other allergic conditions such as conjunctivitis and hemorrhage of the eyeball. It also helps in correcting refractive errors like short/long sightedness. It is effective in glaucoma, where it works to reduce the eyeball tension.

Mud Pack for Head: A head mud pack is usually thick, narrow band. It is applied over the forehead and helps to heal congestive headache pain quickly.

Mud Pack for Face: Fine mud is used for the face. The paste is evenly applied on the face and kept for 30 minutes. It helps in improving the complexion of the skin. In cases of acne, it helps by absorbing excess oils and toxins from the skin. It also helps in reducing dark circles around the eyes.

Mud Pack for Abdomen: The size of a mud pack for abdomen is usually 10" x 6" x 1" for adults. The mud pack is applied for 20-30 minutes. An abdomen mud pack helps in all kinds of indigestion. It is very helpful in decreasing intestinal heat and stimulates peristalsis.

Mud Bath- Mud or clay bath is another mode of treatment. It is applied in the same way as packs, but only on a larger scale on the entire body. In this, mud or clay is first ground and sifted to remove all impurities, and then made into a smooth paste mixed with hot water. Mud is applied to the full body either in sitting or a lying down position. Mud is kept for 45 to 60 minutes and ideally exposed to sunlight, at least intermittently. A mud bath helps in increasing the blood circulation and energizing the skin tissues. It thus helps in cleansing and improving the overall skin the complexion, clear spots and patches on the skin following skin disorders or due to smallpox. Regular mud baths may be considered as a natural beauty treatment procedure as it also helps in improving skin complexion and reducing spots and patches, possibly the result of some skin disorder like chickenpox or small pox. Mud baths are useful in many skin diseases such as psoriasis, urticarial, leprosy, and other skin allergic conditions. This bath is also valuable in getting relief from rheumatic pain or pain in the joints caused by injuries. Care should also be taken to avoid the patient catching a chill during the bath.

Therapeutic Effects of Sun Bath

Chromo therapy also known as chromopathy, color therapy, light therapy, heliotherapy or color logy is a science of healing with colors in various forms and intensities.

Sun is the prime and ultimate source of energy for all beings. Energy is required by plants, animals and human for their daily activities. We get the energy from food. The stored energy in food is also achieved by sun.

Sun light is a form of energy representing Agni among the Panchamahabhuta. Sun ray have seven colors. (VIBGYOR) each colour having its own properties. These colors are employed through irradiation over body or chemotherapy by administering charged water, oil, pill for treatment.

Types of chromo therapy

1. Based upon medium used-
2. Exposure to light
3. Using colored glasses (chromo therapy)
4. Using color charged water (hydro chromo therapy)
5. Using color charged oil
6. Using color charged air

1. Based upon methods of exposure to light

Basking in morning sun- Morning time is ideal. One should lie down on the ground in morning sun rays without wearing the cloth or minimum cloths. The head and genitalia should be covered with cotton cloth or green leaves of banana. Expose the body in supine, prone and lateral positions alternatively.

Initially one should practice the sun bath until a pleasant feeling of warmth is felt (about 30 min.) and then continue till the onset of sweating. After sun bath, rub the body with wet tower till it dries.

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Nothing should be eating 2 hours before and 30 minutes after sun bath. It can be done in sitting or walking condition also.

Benefits-

1. It is useful in skin disorders e.g. eczema, psoriasis, fungal infections.
2. It stimulates the adrenal and sex hormones.
3. It increases muscular strength.
4. It increases energy.
5. It makes the bones and teeth strong.

1. Mild sun bath- This bath is taken when sun raises high in the sky, usually within 3 hours of sunrise when heat is mild. The patient should lie down on a bed sheet spread on the ground and remain almost naked wearing minimum cloth, covered with a thin dry cloth. When his body becomes warm, he should be covered with a wet cloth. The duration is 15 min. initially and then increased gradually up to 40 minutes. Benefits are same as morning sun bath.

2. Walking sun bath- Louis kuhne's sun bath- It is taken in the same way as mild sun bath, but a dry cloth is covered on the body and wet cloth is kept on the diseased part, eyes and face. It is continued till sweating starts. The sweat is wiped off with a wet cloth. It is followed by cool bath.

Duration – not more than 40 min.

3. Trunk pack sun bath- This bath can be taken in spinal bath tub or other tub suitable for taking bath in lying posture. Place the tub in sun with the head side in the shade and spread a thick cushion of wet cloth or Turkish towel of half inch thickness, so as to come under back of the patient from neck to hip. When he lies down on it, a separate wet sheet should be laid for such a length that it may be enough to make a pack around the trunk with the edges overlapping. When the pack gets dried by heat of the sun.

Duration – patient may lie down till he feels relieved.

5. Whole pack sun bath-

6. Sun gazing –For defective eye sight, gazing with open eyes during sun rise in a very mild sun rays daily for 5-15 min. is good. After gazing or before gazing it is desirable to wash the eyes by repeatedly applying balls of wet cloth dipped frequently in very cold water and partially squeezed to hold more amount of water.

Time for Surya Kirana Chikitsa

Sun bath is in the morning and within 3 hours after sun rise and evening in mild sun rays.

Benefits of sun bath

1. Increase blood circulation and
2. Main source of vitamin- D
3. Stimulates digestive power and Increases immunity
4. Eliminate the toxic substance through skin,
5. Stimulate the synthesis of melanin pigment.

Precaution during sun bath-

1. The head, face and eyes should be protected from direct sunlight.
2. Start with minimum time of 5 min and gradually increase up to 40-45 min of exposure to sunlight.
3. During sun bath, divide the duration of exposure into 4 and expose all sides of body i.e. supine, prone, left lateral and right lateral.
4. Sun bath should be taken in a place devoid of breeze.
5. After sun bath one should have water bath.

Chromo therapy

Chromotherapy is a method of treatment of diseases by colour. It is best used as a supportive therapy along with other natural methods of preserving health such as correct diet, adequate rest and relaxation, exercise, yogic Asanas and so on.

According to practitioners of chromotherapy, the cause of any disease can be traced to the lack of a particular colour in the human system. Colour therapy is a technique of restoring imbalance by means of applying coloured light to the body. It was a popular method of cure even in ancient times. Some 2,500 years ago, Pythagoras applied colour light therapeutically and 'colour halls' were used for healing in ancient Egypt, China and India.

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Blue and red colours are considered at the two extremes with yellow representing the midpoint. These are also the three principal colours in a rainbow. A patient is first subjected to an examination to ascertain which colour he lacks. The deficiency is determined by observing the colour of the eyeballs, nails, urine and excrement. In cases of the lack of red the eyes and nails will be bluish, and the urine and excrement white or bluish. If there is a deficiency of the blue colour, the eyes and nails will be reddish and urine and excrement yellowish or red. Every substance on earth contains colour. Even the rays cast on earth by celestial bodies contain colour in the form of white light.

These are natural colours which are highly beneficial to the maintenance of health and for healing diseases

Composition of light and colors

Color is the perceived wavelength of the visible electromagnetic spectrum between 400-700 nm, in which the seven colors (VIBGYOR)namely violet, indigo, blue, green, yellow, orange and red are observed.

Methods of treatment through colored glasses

In this method, sheet of glass of size 30cms x 36 cms. and thickness of 2-4mm of the required colors are needed. These are placed at the window frames or any other convenient place in such a way that the sun rays can pass through them and fall directly on patient's body.

Duration- 30 minutes.

Color	Symbolic	Helpful for	Effect of excess color
Red	Heat, fire and anger	Blood circulation and tones up muscles helpful in cold, anemia, low blood pressure, rheumatism, sprains, polio, paralysis, constipation, indigestion, diabetes, T.B.	Increases anxiety, agitation and stress.
Orange	Promotes harmony, prosperity and pride	Inflammatory conditions, typhoid and malaria, liver trouble, eye trouble, indigestion, small pox, boils, pimples, skin trouble, eczema	Increases anxiety
Yellow	Joy and happiness	Treats diabetes, indigestion, kidney and liver disorders, constipation, eye and throat infections, syphilis and impotence.	Causes exhaustion too much mental activity.
Green	Harmony	Treats nervous conditions, hay fever, ulcers, influenza, malaria, colds, sexual disorders, cancer, eye sight and inflammatory conditions.	Creates negative energy
Blue	Cool, soothing and sedative	Pain, reduces bleeding, heals burns, treats dysentery, colic, asthma, respiratory disorders, high blood pressure and skin problems.	Depressing and sad
Indigo	Truth	Treats cataracts, glaucoma, ear and nose complaints, diseases of lungs, asthma, convulsions and mental complaints and purifies the blood and mind	Headache
Violet	Serenity	Treats nervous and emotional disturbances, arthritis and insomnia.	Negative thoughts

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Contraindications

There are some important contraindications to colour treatment which should be borne in mind while adopting this mode of cure. For instance, the red colour would be injurious in a naturally inflammatory condition of the system, and in case of persons with feverish and excitable temperament. If the red light is employed for too long and frequently, it may produce dangerous fevers.

Similarly, yellow should not be used when the nerves are very active or irritable. Yellow or orange reddish tones may prove injurious in fevers, acute inflammations, delirium, diarrhoea, neuralgia, palpitation of the heart and any condition of over-excitement. In cases of paralysis, chronic rheumatism, gout, consumption and in all cold, pale and dormant conditions of the system, blue, indigo and violet may prove too cooling and constricting and should be avoided.

Fasting Therapy - Its Types and Benefits

Fasting refers to complete abstinence from food for a short or long period for a specific purpose. The word is derived from the old English, 'feast an' which means to fast, observe, be strict.

Fasting is nature's oldest, most effective and yet least expensive method of treating disease. It is recognized as the cornerstone of natural healing. Dr. Arnold Eheret, the originator of the mucusless diet healing system, describes it as "nature's only universal and omnipotent remedy of healing" and "nature's only fundamental law of all healing and curing." The practice of fasting is one of the most ancient customs. It is followed in almost every religion.

The Mohammedan, the Buddhists, the Hindus and many others have their periods of strict fasting. The saints of medieval times laid great stress on this method. The common cause of all diseases is the accumulation of waste and poisonous matter in the body which results from overeating.

Definition

- Fasting is primarily the act of willingly abstaining from some or all food, drink, or both, for a period of time
- Medical context - the metabolic status of a person who has not eaten overnight
- The metabolic state achieved after complete digestion and absorption of a meal.

Importance of fasting

1. Fasting is voluntary abstinence from taking any kind of food for definite time, in order to give rest to digestive system.
2. In naturopathy, the toxins and morbid matter accumulated in the body is the cause of disease.
3. During fasting body eliminates these toxins and morbid matter with a greater speed.
4. It improves the vital power or vital economy because the energy engaged in eliminating the toxins and morbid matter is saved.
5. It is the cheapest mode of treatment in nature cure.
6. Fasting can help reverse the ageing process, and if we use it correctly, we will live longer, happier lives. Just three days a month will do it.
7. Your body will have a chance to heal and rebuild its immune system by regular fasting.
8. You can fight off illness and the degenerative diseases so common in this chemically polluted environment we live in.

Types of fasting

1. According to duration –
   a. Short duration- 2-5 days
   b. Intermittent-1-2 days
   c. Long duration-more than 10 days
2. Depending on the purpose of fasting-
   a. Political
   b. Religious
   c. Therapeutic
3. Depending on the method of fasting-
   a. Dry fasting- without drinking water
   b. Water fasting – only with water
   c. Juice fasting –nursing only juice
   d. Fruit fasting- with eating fruits
   e. Mano diet fasting- by using single type of food

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4. Depending on condition –
   a. In healthy person
   b. In acute illness – fast till the disease subside and person has sense of lightness
   c. In chronic illness- short fast (3-5days) is indicated with proper interval. Positive food is given during the period of breaking fast.

Method of fasting

The best, safest and most effective method of fasting is juice fasting. Although the old classic form of fasting was pure water fast, most of the leading authorities on fasting today agree that juice fasting is far superior to water fast. According to Dr. Rangar Berg, the world famous authority on nutrition, During fasting the body burns up and excretes huge amounts of accumulated wastes. We can help this cleansing process by drinking alkaline juice instead of water while fasting. Elimination of uric acid and other inorganic acids will be accelerated and sugars in juices will strengthen the heart juice fasting is, therefore, thebest form of fasting.

Vitamins, minerals, enzymes and trace elements in fresh, raw vegetable and fruit juices are extremely beneficial in normalizing all the body processes. They supply essential elements for the body's own healing activity and cell regeneration and thus speeding the recovery. All juices should be prepared from fresh fruit immediately before drinking. Canned or frozen juices should not be used.

A precautionary measure which must be observed in all cases of fasting is the complete emptying of the bowels at the beginning of the fast by enema so that the patient is not bothered by gas or decomposing matter formed from the excrements remaining in the body.

Enemas should be administered at least every alternate day during the fasting period.

Fasting is considered after the meal has been digested. If feeling of hunger is their, one should drink water during the breakfast.

The duration of fast depends on the purpose of fasting.

After completion of fast, small quantity of light food, fruits, juice, coconut, water, vegetables soups, dilute butter milk etc. should be taken in breaking the fast. When digestion power increases normal food can be taken.

Beginning of a fast

a. The patient should get as much fresh air as possible and should drink plain lukewarm water when thirsty.
b. Fresh juices may be diluted with pure water.
c. A person is assumed to be fasting after 8–12 hours after intake of food.
d. Post-absorptive state - Metabolic shifts of fasting begin as absorption of a meal is complete (typically 3–5 hours after a meal).
e. Diagnostic fast refers to prolonged fasting (from 8–72 hours depending on age) conducted under medical observation.

Sign of elimination of toxins during fasting

a. Formation of gas, due to disintegration of old putrefied matter.
b. Cotton mouth and expulsion of morbid matter in mouth.
c. Bed breath, due to expulsion of morbid matter through respiratory tract.
d. Coated tongue, due to deposition of eliminated toxins.
e. Elevated body temperature.

Changes during a fast

Many of the fasting changes we experience are related to the body's cycles incurred during the fast.

1. Elimination cycle- Headaches, Dizziness, Inability to focus, Fatigue, Depression and/or anger, White strands of mucus found in stool, Runny nose, Watery eyes or pink eyes, Loss of Sexual desire
2. Reparation cycle- From day 3 to 14 depending on diet, there is a feeling of a certain "burst" of energy, High stimulation, The body will eliminate, Dead or dying cells, Excess fatty

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tissue and trans-fatty acids, Hardened mucus from the lungs and sinuses, Toxins in the bloodstream, spleen, liver, kidneys, cells and tissues, Excess cholesterol.

3. Replenishing cycle-It is important that we replace vital minerals in the body during this period. Replenishment occurs around day 15 until you "break" the fast. These minerals will gear the body into an adjustment mode that helps to strengthen cell walls, restore the immune system, and prevent the body.

Benefits of fasting-

1. To dissolve & eliminate toxins, congestion that have formed in any part of the body
2. To cleanse the kidneys & the digestive system
3. To purify the glands & cells throughout entire body
4. To eliminate all unusable waste & hardened material in joints & muscles
5. To relieve pressure & irritation in nerves, arteries & blood vessels
6. To build a healthy blood stream
7. To keep youth & elasticity regardless of age

Diet Types - Soothing, Eliminative, Constructive, Positive and Negative Diet, Acidic and Alkaline Diet

Food is considered as medicine in naturopathy. The natural food helps to eliminate the toxins deposited in the body and enhance the vital energy and immunity.

Types of food or diet- in naturopathy there are two types of food i.e. positive and negative.

Positive (primary food)	Negative (secondary food)
Healthy food	Unhealthy food
Alkaline in nature	Acidic in nature
Light and easily digestible	Heavy and constipating
Rich in cellulose or roughage	Refined food
Rich in vitamin and minerals	Rich in carbohydrates, protein and fat
Helps to elimination the toxins from the body	Promotes accumulation of the toxins in the body
Non mucus food	Mucus producing food
Examples – vegetables and fruits	Examples – cereals, pulses, milk, egg, nuts, non vegetarian food

Again the food has been divided into three categories

1. Eliminative diet- liquids e.g. lemon juice, fruit juice, coconut water, vegetables soups, butter milk.
2. Soothing diet- fruit juices, gruels, buttermilk, vegetable soups, vegetable juices, raw salads, boiled vegetables, wheat and rice preparations in limited quantity are recommended. Vegetables such as cabbage, celery, lettuce, roots like carrot, string beans, and gourds may be used in the diet. Ripe fruits of all sorts are of great value because they contain germ–destroying acids.
3. Constructive diet- which consists of curds, milk, boiled vegetables, chapatis, rice, dal etc. Meats of all kinds, beef, tea, coffee and animal broths/ soups are strictly excluded because of the presence of tissue wastes, uric acid, creatinine and other substances which are the products of putrefactive changes. The diet should consist of vegetables boiled without adding any type of irritants.

For healthy person the proportion of positive and negative food should be taken 2:1, in diseased it should be 4:1 or 5:1.

According to Naturopathy, the root cause of most of the diseases is the accumulation of morbid matter in the digestive system. It is essential to cleanse it by diverting the energies of the body by fasting. Fasting is essential in almost all diseases. Ayurveda states that it helps not only in cleansing the digestive system, but also all the seven ingredients of the body (lymph, blood, muscle, cartilage, bone marrow, bone and sperm).

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Healthy promoting rules of diet in naturopathy

1. Diet should be taken at fixed timings, usually twice a day.
2. Diet should not be taken unless the previous diet is already digestible.
3. Nothing should be taken between the meals, frequent eating and overeating causes indigestion.
4. Adequately chewing of food is necessary it makes the food digestible.
5. During the meals one should be happy and quiet.
6. Water should be taken in less quantity with meals.
7. Fruits and salad should be compulsory ingredients of diet.

Alkaline Diet- An alkaline diet also known asthe alkaline ash diet, alkaline acid diet, acid ash diet, acid alkaline diet and even sometimes the pH diet is one that helps balance the blood pH level of the fluids in your body, including blood and urine. The pH is partially determined by the mineral density of the foods eat. All living organisms and life forms on earth depend on maintaining appropriate pH levels, and it's often said that disease and disorder cannot take root in a body that has a balanced pH.

Highly Alkaline (pH 9.5 alkaline water Grasses)- Cucumber, Himalayan salt, Spinach (baby and grown), Parsley, Broccoli, Sea Vegetables (Kelp), Green drinks, All Sprouted Beans, Sprouts.

Moderately Alkaline- Beetroot, Basil, Capsicum/Pepper, Cabbage, Celery, Spring Greens, Coriander, Garlic, Ginger, Green Beans, Mustard Greens, Okra, Onion, Radish, Red Onion, Rocket/Arugula, Tomato, Lemon, Lime, Butter Beans, Soy Beans, White Haricot Beans.

Mildly Alkaline- Asparagus, Brussels Sprouts, Cauliflower, Carrot, Leeks, New Baby Potatoes, Peas, Pumpkin, Butternut, Grapefruit, Coconut, Pomegranate, Buckwheat, Lentils, Goat & Almond Milk, Herbs & Spices (Thyme, Mint, Ginger, Cumin etc.), Avocado Oil, Olive Oil, Coconut Oil.

Neutral/Mildly Acidic- Black Beans, Chickpeas, Kidney Beans & Other Beans, Fresh Dates, Sweet Cherry, Watermelon, Millet, Oats/ Oatmeal, Soybeans, Buckwheat Pasta, Brown Rice, Freshwater Wild Fish, Rice & Soy Milk, Brazil Nuts, Sunflower Oil, Grapeseed Oil

Moderately Acidic- Fresh, Natural Juice, Ketchup, Mayonnaise, Butter, Apple, Banana, Blackberry, Blueberry, Cranberry, Grapes, Guava, Mango, Mangosteen, Orange, Peach, Papaya, Pineapple, Strawberry, Goat's Cheese, Vegan Cheese, Rye Bread, Wheat, Wholemeal Bread, Wild Rice, Wholemeal Pasta, Ocean Fish

Highly Acidic- Alcohol, Coffee & Black Tea, Fruit Juice (Sweetened), Cocoa, Honey, Jam, Jelly, Mustard, Rice Syrup, Soy Sauce, Vinegar, Yeast, Dried Fruit, Beef, Chicken, Eggs, Farmed Fish, Pork, Shellfish, Cheese, Dairy Artificial Sweeteners, Syrup, Mushroom

Hydrotherapy - Types of Water Used Based on The Temperature and Therapeutic Effects of Hydrotherapy

Water is the most important therapeutic tools in Naturopathy. Hydrotherapy may be defined as the use of water, in any of its forms, for the maintenance of health or the treatment of disease. Hydrotherapy has been used to treat disease and injury by many different peoples. Also called (Hydrothermal therapy) additionally uses its temperature effects, as in hot baths, saunas, wraps, etc.

History of Hydrotherapy

Father of Hydrotherapy is LUI KUHNE

First contributed by Hippocrates.

Hydrotherapy is commonly attributed to Father Sebastian Kneipp (1821-97), who believed that water would 'dissolve, remove and strengthen'.

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- Jackson
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Hydro – water

Therapy – healing

Hydrotherapy is use of water, either internally or externally, to maintain health and prevent disease. Water will be used in different forms and at different temperature

Classification on Temperature

Very cold – 32 to 55 Degree F

Cold – 55 to 65 Degree F

Cool – 65 to 80 Degree F

Tepid – 80 to 92 Degree F

Warm neutral – 92 to 98 Degree F

Hot – 98 to 104 Degree F

Very hot – 104 Degree F Above

Types of Hydrotherapy

1. Internal hydrotherapy
2. External hydrotherapy

Internal Hydrotherapy: Enema, Colon Hydrotherapy, Drinking hot or cold water etc.

External hydrotherapy: Baths, Packs, Douches, Frictions, Whirlpool, Aqua exercises, Cold rubbings, Fomentation etc.

Different Methods of External Hydrotherapy-

A. Baths- Hot water bath, cold water bath, neutral water bath and alternate bath.

Based on applications-

a. Foot Bath (Pada Snana)

b. Calf Bath (Pindika Snana)

c. Hip Bath (Kati Snana)

d. Spinal Bath (Prushta Snana)

e. Eye Bath (Akshi Snana)

f. Sitz Bath (Mehana Snana)

g. Arm Bath (Hasta Snana)

h. Steam Bath (Bashpa Snana)

i. Full Immersion Bath (Avagaha Snana)

B. Compression

C. Fomentations

D. Packs

a. Full wet sheet pack

b. Trunk pack

c. Ice pack

d. Chest pack

e. Abdominal pack

f. Knee pack

g. Eye pack

h. Head pack

Baths

Water has been used as a valuable therapeutic agent since time immemorial. In all major ancient civilizations, bathing was considered an important measure for the maintenance of health and prevention of disease. It was also valued for its remedial properties. The ancient Vedic literature in India contains numerous references to the efficacy of water in the treatment of disease.

In modern times, the therapeutic value of water was popularized by Vincent Priessnitz, Father Sebastian Kneipp, Louis Kuhne and other European water-cure pioneers. They raised water cure to an institutional level and employed it successfully for the treatment of almost every known disease.

Hot Foot Bath

In this method, the patient should keep his or her legs in a tub or bucket filled with hot water at a temperature of 40^0C to 45^0C. Before taking this bath, a glass of water should be taken and the body should be covered with a blanket so that no heat or vapor escapes from the foot bath.

The head should be protected with a cold compress. The duration of the bath is generally from 5 to 20 minutes. The patient should take a cold shower immediately after the bath.

The hot foot bath stimulates the involuntary muscles of the uterus, intestines, bladder and other pelvic and abdominal organs. It also relieves sprains and ankle joint pains, headaches caused by cerebral congestion and colds. In women, it helps restore menstruation, if suspended, by increasing supply of blood especially to the uterus and ovaries.

Cold Foot Bath

Three to four inches of cold water at a temperature of 7.2^0C to 12.7^0C should be placed

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in a small tub or bucket. The feet should be completely immersed in the water for one to five minutes. Friction should be continuously applied to the feet during the bath, either by an attendant or by the patient by rubbing one foot against the other. A cold foot bath, taken for one or two minutes, relieves cerebral congestion and uterine haemorrhage. It also helps in the treatment of sprains, strains and inflamed bunions when taken for longer periods. It should not be taken in cases of inflammatory conditions of the genito-urinary organs, liver and kidneys.

Arm Bath

The hand and arm may be immersed in neutral, hot or cold water or the two latter alternately. For this purpose employ a foot tub (better one of elliptical shape) with sufficient water to immerse the hand and forearm to the elbow, or including the elbow. Very deep pails may be used. When hot water is used, it should be as hot as can be borne. Immersion of the hands in cold water is useful in controlling epistaxis. To give hot and cold immersion to an infected hand or arm (blood poisoning)employ two pails or tubs, one of the hottest water that can be borne, and the other of ice water with a block of ice in it. To the cold water maybe added one-fourth or one-half dram of crystals of permanganate of potassium, and to the hot water about five times this quantity of oxalic acid.

Immerse the hand and arm in hot water for one and one-half to two minutes, then in the cold for fifteen to thirty seconds. Continue these alternations for twenty-five minutes to an hour, finishing with the cold. Hot water should be added to the tub as fast as can be borne. The procedure should be repeated from one to four times daily as indicated. Other parts of the body, as the foot, may be treated in a similar manner. Massage is strictly contraindicated in infected conditions.

Spinal Bath

The spinal bath is another important form of hydrotherapic treatment. This bath provides a soothing effect to the spinal column and thereby influences the central nervous system. It is given in a specially designed tub with its back raised so as to provide proper support to the head. The bath can be administered at cold, neutral and hot temperatures. The water level in the tub should be an inch and a half to two inches and the patient should lie in it for three to 10 minutes.

The cold spinal bath relieves irritation, fatigue, hypertension and excitement. It is beneficial in almost all nervous disorders such as hysteria, fits, mental disorders, loss of memory and tension. The neutral spinal bath is a soothing and sedative treatment, especially for the highly strung and irritable patient. It is the ideal treatment for insomnia and also relieves tension of the vertebral column. The duration of this bath is 20 to 30 minutes. The hot spinal bath, on the other hand, helps to stimulate the nervous, especially when they are in a depressed state. It also relieves vertebral pain in spondylitis and muscular backache. It relieves sciatic pain and gastrointestinal disturbances of gastric origin.

Hip Bath

It is a treatment where hip region from upper half of thigh region & up to lower body is immersed in water of required temperature to get the desired effect.

The hip bath is one of the most useful forms of hydrotherapy. As the name suggests, this mode of treatment involves only the hips and the abdominal region below the navel. A special type of tub is used for the purpose. The tub is filled with water in such a way that it covers the hips and reaches upto the navel when the patient sits in it. Generally, four to six gallons of water are required. If the special tub is not available, a common tub may be used. A support may be placed under one edge to elevate it by two or three inches. Hip bath is given in cold, hot, neutral or alternate temperatures.

Cold Hip Bath

The water temperature should be 10^0C to 18^0C. The duration of the bath is usually 10 minutes, but in specific conditions it may vary from one minute to 30 minutes. If the patient feels cold or is very weak, a hot foot immersion should be given with the cold hip bath.

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The patient should rub the abdomen briskly from the navel downwards and across the body with a moderately coarse wet cloth. The legs, feet and upper part of the body should remain completely dry during and after the bath. The patient should undertake moderate exercise like Yogasanas, after the cold hip bath, to warm the body.

A cold hip bath is a routine treatment in most diseases. It relieves constipation, indigestion, obesity and helps the eliminative organs to function properly. It is also helpful in uterine problems like irregular menstruation, chronic uterine infections, pelvic inflammation, piles, hepatic congestion, chronic congestion of the prostate gland, seminal weakness, impotency, sterility, uterine and ovarian displacements, dilation of the stomach and colon, diarrhoea, dysentery, haemorrhage of the bladder and so on. The cold hip bath should not be employed in acute inflammations of the pelvic and abdominal organs, ovaries and in painful contractions of the bladder, rectum or vagina.

Hot Hip Bath

This bath is generally taken for eight to 10 minutes at a water temperature of 40^{0}C to 45^{0}C. The bath should start at 40^{0}C. The temperature should be gradually increased to 45^{0}C. NO friction should be applied to the abdomen. Before entering the tub, the patient should drink one glass of cold water. A cold compress should be placed on the head. A hot hip bath helps to relieve painful menstruation, pain in the pelvic organs, painful urination, inflamed rectum or bladder and painful piles. It also benefits enlarged prostatic gland, painful contractions or spasm of the bladder, sciatica, neuralgia of the ovaries and bladder. A cold shower bath should be taken immediately after the hot hip bath.

Care should be taken to prevent the patient from catching a chill after the bath. The bath should be terminated if the patient feels giddy or complains of excessive pain.

Neutral Hip Bath

The temperature of the water should be 32^{0}C to 36^{0}C. Here too, friction to the abdomen should be avoided. This bath is generally taken for 20 minutes to an hour. The neutral hip bath helps to relieve all acute and sub-acute inflammatory conditions such as acute catarrh of the bladder and urethra and subacute inflammations in the uterus, ovaries and tubes. It also relieves neuralgia of the fallopian tubes or testicles, painful spasms of the vagina and prorates of the anus and vulva. Besides, it is a sedative treatment for erotomania in both sexes.

Alternate Hip Bath

This is also known as revulsive hip bath. The temperature in the hot tub should be 400C to 45^{0}C and in the cold tub 10^{0}C to 18^{0}C. The patient should alternately sit in the hot tub for five minutes and then in the cold tub for three minutes. The duration of the bath is generally 10 to 20 minutes. The head and neck should be kept cold with a cold compress. The treatment should end with a dash of cold water to the hips.

This bath relieves chronic inflammatory conditions of the pelvic viscera such as salpingitis, ovaritis, cellulitis and various neuralgias of the genito-urinary organs, sciatica and lumbago.

Immersion Baths

This is also known as full bath. It is administered in a bath tub which should be properly fitted with hot and cold water connections. The bath can be taken at cold, neutral, hot, graduated and alternate temperatures.

Cold Immersion Bath

This may be taken for four seconds to 20 minutes at a temperature ranging from 10ãC to 23.8ãC.Before entering the bath, cold water should be poured on the patient's head, chest and neck and the head should be protected with a cold moist towel. During the bath, the patient should vigorously rub his or her body. After the bath the body should be quickly dried and wrapped up in a blanket. If the climate is favourable, moderate exercise should be undertaken.

This bath helps to bring down fever. It also improves the skin when taken for five to 15

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seconds after a prolonged hot bath, by exhilarating circulation and stimulating the nervous system. This bath should not be given to young children or very elderly persons, nor be taken in cases of acute inflammation of some internal organs such as acute peritonitis, gastritis, enteritis and inflammatory conditions of uterus and ovaries.

Graduated Bath

The patient should enter the bath at a temperature of 31°C. The water temperature should be lowered gradually at the rate of 10°C per minute until it reaches 25°C. The bath should continue until the patient starts shivering. The graduated bath is intended to avoid nervous shock by sudden plunge into the cold water. This bath is often administered every three hours in cases of fever.

It effectively brings down the temperature except in malarial fever. Besides, it also produces a general tonic effect, increases vital resistances and energizes the heart.

Neutral Immersion Bath

This bath can be given from 15 to 60 minutes at a temperature ranging from 26°C to 28°C. It can be given for long duration, without any ill-effects, as the water temperature is akin to the body temperature. The neutral bath diminishes the pulse rate without modifying respiration.

This treatment is the best sedative. Since the neutral bath excites activity of both the skin and the kidneys, it is recommended in cases relating to these organs. It is also beneficial for cases of organic diseases of the brain and spinal cord, including chronic inflammatory conditions such as meningitis, rheumatism and arthritis.

A neutral immersion bath taken for 30 to 60 minutes is highly beneficial in general dropsy, due to cardiac or renal diseases. It also helps those suffering from multiple neuritis, alcoholism and other narcotic habits, chronic diarrhoea, peritonitis and chronic affections of the abdomen. In such cases the bath may be given daily for 15 to 30 minutes. This bath is also useful in the toxemic conditions caused by dyspepsia and purities. The neutral bath should not be prescribed in certain cases of eczema and other forms of skin diseases where water aggravates the symptoms, nor in cases of extreme cardiac weakness.

Hot Immersion Bath

This bath can be taken from two to 15 minutes at a temperature from 36.6°C to 40°C. Generally this bath is started at 37°C and the temperature is then gradually raised to the required level by adding hot water. Before entering the bath, the patient should drink cold water and also wet the head, neck and shoulders with cold water. A cold compress should be applied throughout the treatment. This bath can be advantageously employed in dropsy when there is excessive loss of tone of the heart and blood. This bath also relieves capillary bronchitis and bronchial pneumonia in children. It relieves congestation of the lungs and activates the blood vessels of the skin muscles. The bath should be terminated as soon as the skin becomes red.

In pneumonia and suppressed menstruation, the bath should be administered at 37.7°C to 40°C for about 30 to 45 minutes. This bath should be given when the menstruation is due and may be repeated for two to three days in succession. In dysmenorrheal, this bath should be given at 38°C to 44.4°C for 15 minutes.

In chronic bronchitis a very hot bath taken for 5 to 7 minutes should be accompanied with rubbing and friction. This relieves congestion of the mucous membrane and provides immediate relief after the bath; oil should be applied to the skin if necessary.

The hot bath is a valuable treatment in chronic rheumatism and obesity. It gives immediate relief when there is pain due to stones in the gall bladder and the kidneys. The hot bath should not be taken in cases of organic diseases of the brain or spinal cord, nor in cases of cardiac weakness and cardiac hypertrophy.

Epsom Salt Bath

The immersion bath tub should be filled with about 135 liters of hot water at 40°C. One to 1 kg. of Epsom salt should be dissolved in this water.

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The patient should drink a glass of cold water, cover the head with a cold towel and then lie down in the tub, completely immersing the trunk, thighs and legs for 15 to 20 minutes. The best time to take this bath is just before retiring to bed. This is useful in cases of sciatica, lumbago, rheumatism, diabetes, neuritis, cold and catarrh, kidney disorders and other uric acid and skin affections.

Precaution

Certain precautions are necessary while taking these therapeutic baths. Full baths should be avoided within three hours after a meal and one hour before it. Local baths like the hip bath and foot bath may, however, be taken two hours after a meal. Clean and pure water must be used for baths and water once used should not be used again. While taking baths, temperature and duration should be strictly observed to obtain the desired effects. A thermometer should always be used to measure the temperature of the body. Women should not take any of the baths during menstruation. They can take only hip baths during pregnancy till the completion of the third month.

Full Wet Sheet Pack

This is a procedure in which the whole body is wrapped in a wet sheet, which in turn is wrapped in a dry blanket for regulating evaporation. The blanket should be spread on the bed with its edges hanging over the edge of the bed. The upper end should be about eight inches from the head of the bed. Then spread a linen sheet wrung out in cold water over the blanket so that its end is slightly below the upper end of the blanket. The patient should lie on the bed sheet with his shoulders about three inches below the upper age. The wet sheet should be weekly wrapped round the body of the patient, drawn in, tightly tucked between the legs and also between the body and the arms. The sheet should be folded over the shoulders and across the neck. Now the blanket should be drawn tightly around the body and tucked in along the side in a similar manner, pulling it tightly. The ends should be doubled up at the feet. A Turkish towel should be placed below the chin to protect the face and neck from coming into contact with the blanket and to exclude outside air more effectively. The head should be covered with a wet cloth so that the scalp remains cold. The feet should be kept warm during the entire treatment. If the patient's feet are cold, place hot water bottles near them to hasten reaction. The pack is administered for half an hour to one hour till the patient begins to perspire profusely. He may be given cold or hot water to drink. This pack is useful in cases of fever especially in typhoid and continued fevers, and benefits those suffering from insomnia, epilepsy and infantile convulsions. It is useful in relieving chronic cold and bronchitis and helps in the treatment of rheumatism and obesity.

Steam Bath (Bashpa Snana)

Steam bath is one of the most important time-tested water treatments which induces perspiration in a most natural way. The patient, clad in minimum loin cloth or underwear, is made to sit on a stool inside a specially designed cabinet. Before entering the cabinet, the patient should drink one or two glasses of cold water and protect the head with a cold towel. The duration of the steam bath is generally 10 to 20 minutes or until perspiration takes place. A cold shower should be taken immediately after the bath.

Very weak patients, pregnant women, cardiac patients and those suffering from high blood pressure should avoid this bath. If the patient feels giddy or uneasy during the steam bath, he or she should be immediately taken out and given a glasss of cold water and the face washed with cold water.

The steam bath helps to eliminate morbid matter from the surface of the skin. It also improves circulation of the blood and tissue activity. It relieves rheumatism, gout, uric acid problems, and obesity. The steam bath is helpful in all forms of chronic toxemias. It also relieves neuralgias, chronic nephritis, infections, tetanus and migraine.

Kuhne's Friction Sitz Bath

This is also known as genital bath or Linga Snan.

Requisites- Hip bath tub, a stool specially made for this, soft linen cloth.

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Water Temperature- Cold water 18-24 °C.

Duration- 2-10 minutes.

Procedure- In the hip bath tub, the stool specially made for this bath is placed. The tub is filled with cold water leaving the top of the stool dry. The patient then sits on the stool, keeping the legs outside. In case of a female patient, she dips a soft linen cloth in the water and gently washes the genitals from top, downwards. It is important that the external lips only be washed and inner parts of sexual organs remained unwashed and untouched.

In case of males, the extreme edges of the foreskin of the genitals are washed in cold water. The patient should hold the foreskin between his middle and forefinger of the left hand and draw as far as possible over tip of the glans penis still the skin touches the water level in the tub. He should then gently wash the extreme end of the foreskin with soft cloth. Under no circumstance should the cloth in the right hand touch the glans penis.

Uses- This treatment stimulates the nervous system, since the genitals are known as an important centre of central nervous system. Fast healing of Painful anal fissure, haemorrhoids, dysmenorrhea, prostate, bladder infalmmaton, PID and atonic constipation.

Whirl Pool Bath

Water Temperature- Cold 18-24°C, neutral 32-36°C

Duration- Between 15 to 45 minutes

Procedure- The water revolves in a big well - types tub. When the patient enters the tub he gets a gentle massage by the whirling water. A normal adult with good physique can take this bath with cold water.

Uses- The bath is a powerful stimulant for muscular and circular activities. When given with cold water it reduces the temperature of the body, but stimulates perspiration, hearts activity and other vital functions. Since the cold bath increases the blood pressure, it is not advisable for the high blood pressure patients. Because of increased respiratory movement there will be rigorous fluxion through the brain thereby making the brain more alert and active. The sudden contact of cold water stimulates the activity of the kidneys, liver and peristalsis of intestines, hence is useful in chronic constipation and disorders of the kidney and liver. Persons emaciated due to deficient absorption of nutrition will benefits as this increases the appetite as well as the digestion and assimilation like steam bath, sun bath, sauna bath etc, for short duration.

Poor circulation, chronic edema, Separate dead tissue, Pain relief in amputations (phantom pain), After removal of plaster cast (fractures), Stiff joints, Infected wounds with added antiseptic agent, Arthritis with stiff and swollen joints, Poliomyelitis and paraplegia to improve circulation, Traumatic and chronic inflammatory conditions, Weak and painful feet, As preparation to massage, passive stretching and exercises.

Contraindication- Diabetes mellitus, varicose veins, Advanced arteriosclerosis, Advanced peripheral vascular diseases.

It can be created in any size tub or tank, making it possible to immerse the whole body for hydro-massage effect.

The whirlpool bath combines the values of conductive heat and gentle massage.

The hydro-massage effect accomplishes the following :

1. A sedative action.

2. A relief of pain by stimuli which act through the pain gait mechanism.

3. A relaxation of muscle spasms.

Action :

- Producing vasodilatation
- Improving local arterial and lymphatic circulation.
- Softening of scar tissue.
- Breaking down old adhesions after fractures of sprains.
- Cleaning and stimulation of wounds.
- Mechanically removing dirt, dead tissue and pus.
- Causing regression of the inflammatory process.
- Diminution of edema and effusion.

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Types of Whirl Pool Baths

1. Combination of arm/leg and hip whirlpool tank. The electric turbine ejector produces a stream of aerated water. A seat provides comfort and security to the patient.
2. Vibra bath unit: the water is agitated or circulated by means of air blown into water or by turbine or by one or several ejector placed water jets. There are portable whirlpools for the elbow. The Whirlpool bath use can be started as soon as the second day after a soft tissue injury.
3. Jacuzzi (hydro-massage unit): can be used in any tank to provide a controlled supply of whirling aerated water.

Compression

Cold compression : Cold compression is a local cold application by means of a cloth dipped in cold water.

Requisites- Thick cotton or linen cloth or large towel 2 nos.

Water temperature- Cold water 18-24^{0}C or ice water 0 ^{0}C wherever indicated.

Duration-20 minutes, may be prolonged in some condition.

Procedure-The cloth should be folded into four folds and dipped in cold water. Before application it should be wrung well and applied on the concerned part of the body. When the compress is applied continuously, it should be renewed frequently by using two compresses alternately. The compress can be applied to head, neck, chest, abdomen, spine or on any inflamed portion of the body.

Uses- The cold compress is used to regulate the blood circulation and function of liver, spleen, stomach, kidneys, intestines, lungs, brain, uterus, bladder and other internal organs. It is used to control inflammatory conditions of these organs. Treating localized inflammatory condition superficial or deep. In cases of fever, applied over area of heart reduces palpitation. It is helps stop bleeding from piles and hemorrhage. In severe vomiting, the ice bag may apply over the stomach.

Abdominal Cold Compress

Procedure- Dip a towel in cold water and bring it to remove excess water. Fold the towel into 3 or 4 folds to make it 12-14 inches long and 10 inches wide. Place the towel on the abdomen, covering it with another dry towel or woolen cloth. After 10 minutes, reverse the towel so that the top portion touches the abdomen and leave it there for another 10 minutes. If necessary repeat the process for longer time by dipping the towel in cold water.

Effects- it increases the blood circulation to the abdominal organs, activates metabolic functions, reduces inflammation and calms the nervous system. It produces a feeling of comfort and relives pain and congestion in digestive, reproductive and urinary organs.

Heat Compress

The heating compress is a cod compress covered up in such a manner that warming occurs soon. The effect is that of a mild application of moist heat. A heating compress consists of three or four folds of linen cloth dipped in cold water and wrung out and covered completely with dry cloth and flannel or blanket to prevent circulation of air and help accumulation of body heat. The duration of the application is minimum one hour, but sometimes can be extended to several hours. If applied at night and the patient falls asleep he /she should not be disturbed. After removing the compress, the area should be rubbed with a wet cloth and dried with a towel. The heating compress is applied to throat, chest, abdomen, joints and so on.

Chest Compress or Chest Pack

Requisties- Two cotton chest compress and blanket. The size of compress should be 2 to 2.5 meters long and 0.5 meter wide depending upon the size of the chest of the patient.

Duration- 1 hour

Procedure- One cotton compress is dipped in cold water and wrung out. The cloth is placed on the back and the two ends are brought forward under the armpit on each side. The right half is crossed over the left shoulder and the left part over

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the end, across the right shoulder. Both are again crossed at the aback and ends are brought forward under the armpits and tucked in at the front. Cover this with a dry cloth and then with a flannel. The pack should be as comfortably tight as possible.

Uses- This application will have very soothing effect, most of patients fall asleep within minutes. It is helpful in relieving Cold, Bronchitis, Asthma, Pleurisy, Pneumonia, Fever, Cough, and Whooping Cough.

Abdominal Pack

Requisties- Two Cotton cloths of 2 meters long and ¼meter wide. Blanket 1X ¼meter.

Duration- 1 hour.

Procedure- Dip the cotton cloth in cold water and wring out to remove the excess water. Wrap the cloth around the abdomen from lower part of the ribs to the groin. Over this, wrap the dry cloth and finally the flannel so that the pack fits snugly.

Uses- abdominal compress is useful in cases of Gastritis, hyperacidity, indigestion, poor blood circulation to the liver, Jaundice, constipation and other complaints relating to the abdominal organs.

Throat Pack

Requisties - Two cotton cloths and a flannel.

Procedure- wraps the cold cloth around the neck in several layers and on that the dry cloth like in any other pack and finally dry flannel.

Duration- 1 hour

Uses- Throat compress is useful in treating sore throat, hoarseness, tonsillitis, Pharyngitis, Laryngitis, inflammation of Eustachian tubes etc.

Knee pack

Knee pack is the heating compresses applied to the knees, like the other packs.

Requisties- Materials as used in throat pack.

Duration- 1 Hour

Uses- The knee joint compress is helpful in treating inflamed knee and is useful in Arthritis to relieve pain and stiffness.

Fomentation

Requisties-

1. Hot water bag or cotton wrung in hot water
2. A cold compress
3. Dry cloth.

Water Temperature- 42 -45°C.

Duration- 5-7 minutes

Procedure - when the hot water bag is used, it is advisable to cover the area of the application with a cotton cloth wrung in cold water. Fomentation is then applied over it. After the application is over, a cloth dipped in cold water should be placed on the area of application for 1-2 minutes. After removing the wet cloth, the area should be covered with a dry cloth for at least 30-40 minutes. If the symptoms recur, the application should be renewed.

Uses- for relieving acute pain in any part of the body, especially in the abdomen, it is an invaluable treatment. In arthritic pains, this may be repeated twice or thrice in a day for better results. In cases like Bronchitis, Asthma, Pneumonia, Pleurisy, fomentation to the upper back gives immediate relief. It also helps to relives pain caused due to gall stones, kidney stones, infections, jaundice etc.

No.	Bath.	Temperature	Average Degrees F	Duration of Bath. Temp.
1.	Sponge bath	50-70	60	No fixed time
2.	Cold compress	34-50	40	Until warmed
3.	Cooling compress	60-70	60	Until warmed
4.	Stimulating compress	50-60	60	Until dry
5.	Hot compress	110-130	120	Until cooled

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6.	Hot fomentation	120-160	140	No fixed time
7.	Dry full pack Warm	-	-	Until sweating
8.	Hot wet pack	120-130	125	$^1/_2$ to 1 hour
9.	Cold wet pack	40-70	60	$^1/_2$ to 1 hour
10.	Hot foot bath	105-120	110	5 to 30 minutes
11.	Cold foot bath	50-60	55	1 to 5 minutes
12.	Hot sitz bath	105-120	110	5 to 20 minutes
13.	Cold sitz bath.	50-8-	60	5 to 15 minutes
14.	Hot full bath	100-115	104	2 to 10 minutes
15.	Cold full bath	50-70	60	3 to 10 minutes
16.	Warm full bath	96-100	98	5 to 30 minutes
17.	Neutral full bath	94-96	95	20 to 60 minutes
18.	Turkish bath	150-200	180	10 to 20 minutes
19.	Russian bath	110-130	120	10 to 15 minutes

Therapeutic Effects of Massage

Massage is an excellent form of passive exercise. The word is derived from the Greek word 'massier' which means to knead. It involves the scientific manipulation of the soft tissues of the body. If correctly done on a bare body, it can be highly stimulating and invigorating.

Massage is an important nature cure procedure which is based on Vayu Mahabhuta. Ayurveda also advocated massage as a useful Bahiraparamarjana Chikitsa in the name of Abhyanga, Udarvatana, Utsadana.

It is defined as "scientific manipulation of the soft tissue of the body."

As far back as 400 B.C., the great Hippocrates, the father of medicine, employed massage and manipulation in healing his patients. Since then it has been used as a mode of treatment for many ailments and it has restored many a sufferer to health and vigor.

Massage is a term which is used for the group of systematic and scientific manipulation of the bodily tissues. Which are best performed with the hands (palms) for the purpose of affecting nerves and muscular systems and general circulation.

Benefits- The general massage, dealing with all parts of the body, is highly beneficial in many ways. It tones up the nervous system, influences respiration and quickens the elimination of poisons and waste material from the body through the various eliminative organs such as the lungs, skin, kidneys and bowels. It also boosts blood circulation and metabolic processes. A massage removes facial wrinkles, helps to fill out hollow cheeks and neck and eases stiffness, sore muscles and numbness.Systemic rubbing or manipulating body parts with oil, water, powder or without them is called massage. However natural massage does not requires massaging media like oil, powder.

Types of Massage

1. **According to system-** Ayurvedic massage – Away from the heart or in the direction of artery.
   Swedish massage – Towards the heart or in the direction opposite to the artery.
2. **According to material** –
   1. Dry massage-
   2. Powder massage

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3. Paste massage
4. Oil massage

Various movements

There are five fundamental modes of manipulation in massage and these are: effleurage (stroking), friction (rubbing), petrissage (kneading), tapotement (percussion) and vibration (shaking or trembling).

1. **Effleurage-** This involves sliding with the hands, using long even strokes over the surface of the body. Effleurage is performed in five ways, namely stroking with (I) palms of two hands; (ii) the palm of one hand; (iii) the knuckles; (iv) the ball of the thumb and (v) the finger tips. Effleurage increases blood circulation and soothes the nervous system. It also warms and relaxes. It is very helpful in atrophied condition of the skin.
2. **Friction-** The movements, which are circular in nature, are performed with the help of the thumb and tips of fingers or the palm of the hand towards the joints or around the joints. Friction limbers up joints, tendons, and muscles and facilitates the removal of deposits by breaking them. It also helps in reducing swelling after nerve inflammation.
3. **Petrissage-** This is the process of kneading, pressing and rolling of the tissues and is performed with one or both hands, with two thumbs or with thumbs and fingers. One should apply heavy pressure for deep kneading and light pressure for superficial kneading. Petrissage is a treatment of the muscles. It increases nutrition, strengthens muscles, relieves intestinal congestion and helps elimination of the poisons. It boosts long activity and cellular respiration, eliminates fatigue poisons and tones up nerve endings.
4. **Tapotement-** This involves hacking, tapping, clapping and beating and is achieved by striking the body rapidly. Short andquick blows are generally given from the wrist. Tapotement helps in atrophied condition of the muscles. It increases blood supply, soothes nerves and strengthens muscles.
5. **Vibrations-** This is achieved by rapidly shaking the pressing movements by use of the hand or fingers on the body. Vibrating hand should move constantly. This is beneficial in neuritis and neuralgia after the inflammatory stage is over. It stimulates circulation, glandular activity and nervous plexuses. It also helps in bowel movement.

Another form of massage helpful in most elements is the vibratory massage. This can be done by trained persons only. The vibratory muscle is more efficiently administered by special, electrically operated machine.

Material for Massage- Cotton seed oil is most commonly used for massaging, but butter is used for filling out cheeks and the neck and also for breast enlargement. If the patient is averse to oil, talcum powder may be used. Oil should not be used by persons with excessive body hair. General body massage may be done for 40 to 45 minutes and local body massage for 10 to 15 minutes. The oil should be washed off completely after massage.

Massage of the Joints- Stiff and swollen joints can be cured by massage combined with mechanical movements. Massage is, however, not recommended in serious inflammatory cases of the joints and in tubercular joints. It should also be avoided in infectious diseases like diphtheria and gonorrhea which cause formation of pus as massage may spread the pus to the entire system. Sprains and bruises can be cured by massage. In these cases, affected parts should first be bathed with hot water for 15 to 30 minutes. Next the massage should be done for a few minutes. Gentle stroking and kneading is recommended on and around the injured tissues. Fractures can also be treated through massage.

Massage thus provides additional nourishment to feed the muscular tissues, helping them to grow strong. Tapping, striking, and vibrating help the muscle to develop its contractile power. Muscle massage is brought by first effleurage, kneading, followed by tapotement. Later, active and passive movements are given.

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Abdominal Massage- This form of massage

is beneficial in constipation. It stimulates the peristalsis of the small intestines, tones up the muscles of the abdomen walls and mechanically eliminates the contents of both large and small intestines. Abdominal massage should not be done in general, femoral, inguinal and umbilical hernia, inflammation of the uterus, bladder, ovaries and fallopian tubes, kidney stones, bladder or gall bladder, ulcers of the stomach and intestines, and pregnancy.

Precautions during massage

The masseur should have better health and power than the patient.

The masseur should have good temperature of his hands.

The nails should be clean and cut and hands should be washed before massaging.

The masseur should watch the reaction of person and apply the pressure according to that.

Effect of massage- Mechanical effects-

1. Removes dead surface cells and allow the sweat glands, hair follicles and sebaceous glands to free from obstruction and to function better.
2. Increases warmth by stimulating the blood circulation.
3. Physiological system-
4. CS-Increases venous and lymphatic drainage and thus allowing fresh blood to treated tissue.
5. CNS-Massage removes or reduces the noxious substance and thereby reduces the pain by reducing the response of pain receptor.
6. Musculoskeletal system- massage reduces muscle tension and thus relaxes the muscles.
7. Psychological system- It reduces anxiety, stress, sleeplessness and gives a feeling of wellbeing.

Contraindication of massage

1. Skin disorder which would be irritated by either increase in warmth or lubricants e.g. Eczema.
2. When superficial infection are suppurating.
3. In the presence of recent unhealed scars or open wounds.
4. Inflammation of joint
5. Massage near on recently fractured sites.

MCQ on Naturopathy

1. Father of Indian Naturopathy....
   A) Mahatma Gandhiji
   B) Vittaldas Modi
   C) Lakshaman Sharma
   D) Jawaharlal Nehru
2. According to Fundamentals of Naturopathy, Acute diseases are.....
   A) Remedial/ Cleansing agents
   B) Detrimental
   C) Unfavorable condition for the body
   D) Enervation
3. According to Mahatma Gandhji, Prayers is for.....
   A) Mental peace. B) Food for soul.
   C) Intellectual peace.
   D) Harmony between body and mind.
4. According to Fundamentals of Naturopathy, Primary manifestation of disease is due to
   A) Parasites B) Virus
   C) Wrong food habits and lifestyle
   D) Bacteria
5. According to Fundamentals of Naturopathy, Diseases roots from ———
   A) Self control. B) Self ignorance.
   C) Self indulgence. D) All of the above.
6. Return to nature is derived by.....
   A) Adolf Just B) Vincent Presnitz
   C) Louis Pasture D) Louis Khune
7. Toxin liquefies & gets thrown out from body through the medium of sweat iN
   A) Steam bath effect B) Curing disease
   C) Healing action D) Nourishing action
8. Body gets heat from hot bath & due to this __
   A) Prevention of toxin occurrence
   B) Blood purifies
   C) Man becomes free from disease
   D) Dilatation of blood capillaries occurs & blood flow increases

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9. According to naturopathy the cause for disease is _____
   A) Microorganisms B) Food& activities
   C) Obstruction to nature's way
   D) Apathya
10. These are different types of massage
   A) Rubbing, beating B) Stroking, tapping
   C) Vibrating D) All above
11. Benefits of natural bath are_____
   A) Removal of morbid matter
   B) Increase the digestion power
   C) Increases immunity D) All above
12. National Institute of Naturopathy is in
   A) Pune B) Delhi
   C) Bengaluru D) Hyderabad
13. Visamedicatrix Naturae means...
   A) Healing power of nature
   B) Natural diet
   C) Belief in nature D) Fasting
14. Healing power of nature is called as
   A) Vital power B) Swasthya
   C) Prana D) Energy
15. Fasting therapy is of which mahabhoot
   A) Vayu B) Prithvi
   C) Aakash D) Agni
16. Heliotherapy uses which natural element for treatment
   A) Water B) Air
   C) Sun D) Wind
17. .....is not a types of Swedish Massage
   A) Effleurage B) PÊtrissage
   C) Tapotement D) Compression
18. Contraindication of the sun bath
   A) Fever B) Lumbago
   C) Skin Disease D) Sciatica
19. Whatever the diagnosed root cause, there will always be common signs and symptoms.
   A) True B) False
20. The naturopath may use a limited variety of measures in the treatment of clients.
   A) True B) False
21. Naturopathy's basis and some of the methods used in the treatment are more than _____ years old.
   A) 1000 B) 1500 C) 2000 D) 2500
22. Which of the following is considered a natural therapy in Naturopathy?
   A) Bloodletting B) Homeopathy
   C) Physical therapy D) Colon hydrotherapy
23. What is hydrotherapy in Naturopathy?
   A) The study of water quality
   B) The use of water for therapeutic purposes
   C) A form of chiropractic care
   D) A type of massage therapy
24. Which natural therapy is based on the belief that "like cures like"?
   A) Herbal medicine B) Homeopathy
   C) Acupuncture D) Aromatherapy
25. In Naturopathy, what is the significance of the healing power of nature?
   A) It is considered ineffective and not used in treatment.
   B) It plays a central role in supporting the body's inherent ability to heal itself.
   C) It is only relevant in traditional medicine.
   D) It is replaced by advanced medical interventions.
26. Mud therapy is often used in the treatment of:
   A) Cardiovascular diseases
   B) Respiratory infections
   C) Musculoskeletal conditions
   D) Vision problems
27. What is the general principle behind mud therapy's therapeutic effects?
   A) Cooling the body
   B) Increasing inflammation
   C) Providing nutrients to the skin
   D) Absorbing and removing toxins from the body
28. In mud therapy, which temperature range is typically recommended for applying mud to the body?
   A) Extremely hot B) Room temperature

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C) Warm, but not scalding
D) Extremely cold

29. Which type of mud is commonly used in mud therapy due to its high mineral content?
A) Red clay B) Sand
C) Ordinary garden soil D) Black mud

30. Fasting therapy typically involves abstaining from which of the following?
A) Water
B) All foods and beverages
C) Solid foods, but not liquids
D) Carbohydrates

31. What is the primary goal of fasting therapy?
A) Rapid weight loss
B) Detoxification of the body
C) Boosting metabolism
D) Gaining muscle mass

32. Which type of fasting involves consuming only water for an extended period of time?
A) Intermittent fasting
B) Dry fasting
C) Juice fasting
D) Modified fasting

33. What is the typical duration of a short-term fast in fasting therapy?
A) 1-2 days B) 1 week
C) 30 days D) 3-6 months

34. Which health condition or concern is fasting therapy often used to address?
A) Vitamin deficiency
B) Muscle building
C) Digestive disorders
D) Weight management and metabolic health

35. What is the primary principle behind fasting therapy's potential health benefits?
A) Promoting overeating during non-fasting periods
B) Resetting the body's metabolism
C) Reducing caloric intake to promote weight loss
D) Giving the digestive system a break to allow for healing and detoxification

36. Which type of fasting involves alternating between fasting and non-fasting days?
A) Prolonged fasting B) Intermittent fasting
C) Dry fasting D) Water fasting

37. Which form of fasting therapy alternates between periods of eating and fasting?
A) Dry fasting B) Juice fasting
C) Intermittent fasting D) Prolonged fasting

38. Fasting therapy is often used as a complementary approach to:
A) Promote overeating
B) Replace medical treatments
C) Enhance the effects of medications
D) Support various health conditions

39. During a water fast, what is the recommended beverage to consume?
A) Coffee
B) Herbal tea
C) Carbonated soda
d) Water is the only beverage allowed.

40. Which health concern is fasting therapy generally not recommended for?
A) Obesity B) Metabolic disorders
C) Eating disorders D) Insomnia

41. Which type of fasting typically involves abstaining from both food and water for a specified period?
A) Water fasting B) Dry fasting
C) Intermittent fasting D) Juice fasting

42. What is the fundamental idea behind color therapy (chromotherapy)?
A) Using colors to create aesthetic designs
B) Balancing the body's energy centers with specific colors
C) Enhancing vision and color perception
D) Treating mental health disorders with colorful artwork

43. In color therapy, which color is often associated with promoting a sense of calm and tranquility?
A) Red B) Yellow
C) Blue D) Orange

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44. Which energy center in the body, according to some color therapy systems, is associated with the color green?
A) Root chakra B) Solar plexus chakra
C) Heart chakra D) Crown chakra

45. What is the term for using colored light to treat specific health conditions in color therapy?
A) Coloration B) Chromo-pathy
C) Phototherapy D) Prism therapy

46. Which color is often used in color therapy to stimulate energy and creativity?
A) Purple B) Green
C) Blue D) Yellow

47. How is color therapy sometimes applied in the context of interior design and decor?
A) Using bright, energetic colors in relaxing spaces
B) Matching colors to personal preferences without any therapeutic purpose
C) Creating color schemes to influence mood and well-being
D) Avoiding color altogether to maintain a neutral environment

48. What is the term for the practice of wearing specific colors of clothing or accessories to affect one's mood and energy in color therapy?
A) Color meditation
B) Chromotherapy fashion
C) Prismatic attire D) Spectrum dressing

49. Which ancient civilization is often credited with the early use of color therapy in healing practices?
A) Greek B) Egyptian
C) Chinese D) Roman

50. In color therapy, which color is associated with promoting vitality, energy, and courage? A
A) Purple B) Blue
C) Red D) Yellow

51. What is the term for the practice of exposing individuals to natural sunlight or artificial light sources of specific colors in color therapy?
A) Solar infusion B) Light therapy
C) Prism illumination D) Tint treatment

52. According to color therapy, which color is often used to alleviate symptoms of depression and promote emotional healing?
A) Green B) Orange
C) Pink D) Brown

53. In color therapy, what is the belief regarding the color white?
A) It has no therapeutic properties.
B) It balances all energy centers in the body.
C) It promotes sleep and relaxation.
D) It should be avoided as it disrupts energy flow.

54. Who is often considered the "father of modern Naturopathy" and played a significant role in the development of Naturopathic medicine in the United States?
A) Samuel Hahnemann
B) John Bastyr
C) Benedict Lust
D) Andrew Weil

55. The term "Naturopathy" is derived from two words: "nature" and "pathos." What does "pathos" mean in this context?
A) Suffering or disease
B) Harmony with nature
C) Healing through spirituality
D) Natural living

56. Naturopathy has its roots in various traditional healing systems, including:
A) Ayurveda, Chinese medicine, and Native American medicine
B) Allopathy, homeopathy, and chiropractic care
C) Surgery, radiation therapy, and pharmaceutical drugs
D) Psychoanalysis, hypnotherapy, and electroshock therapy

57. In the late 19th century, where did the early foundations of Naturopathy begin to take shape and gain recognition?
A) Germany B) India
C) United States D) Egypt

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58. What is one of the key principles of Naturopathy that emphasizes the body's inherent ability to heal itself?
A) Primum Non Nocere
B) Vitalism
C) Surgery as the last resort
D) Pharmacology

59. The first Naturopathic college in the United States was founded by Benedict Lust in which year?
A) 1895 B) 1910
C) 1950 D) 2000

60. Naturopathic medicine gained recognition and licensure in which U.S. state in 1913, paving the way for its formal establishment as a regulated healthcare profession?
A) California B) New York
C) Illinois D) Texas

61. What ancient healing tradition is often considered an early precursor to Naturopathy due to its emphasis on natural remedies and holistic well-being?
A) Traditional Chinese Medicine
B) Ayurveda
C) Allopathy D Homeopathy

62. In the early 20th century, Naturopathy gained popularity as a response to what prevailing medical practice?
A) Surgery B) Bloodletting
C) The use of synthetic drugs
D) Vaccination

63. Which Naturopathic doctor played a significant role in the resurgence of Naturopathy in North America during the mid-20th century?
A) Benedict Lust
B) John Bastyr
C) Samuel Hahnemann
D) Andrew Weil

64. What is the term for the foundational principle of Naturopathy that advocates "First, do no harm"?
A) Homeostasis B) Vitalism
C) Primum Non Nocere D) Allopathy

65. The formation of the American Naturopathic Association in 1936 was a significant milestone in the history of Naturopathy. In which city was this association established?
A) New York B) Chicago
C) San Francisco D) Los Angeles

66. Which state was the first to establish licensing laws for Naturopathic doctors in the United States in 1905?
A) California B) Texas
C) Oregon D) Illinois

67. Naturopathy saw a decline in the mid-20th century but experienced a resurgence in interest during the:
A) 1950s B) 1970s
C) 1990s D) 2010s

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Answers on MCQ on Naturopathy

1. A	16. C	31. D	46. D	61. B
2. A	17. D	32. B	47. C	62. C
3. D	18. A	33. A	48. D	63. B
4. C	19. A	34. D	49. B	64. C
5. D	20. B	35. D	50. C	65. C
6. A	21. C	36. B	51. B	66. C
7. A	22. D	37. C	52. A	67. B
8. D	23. B	38. D	53. B	
9. C	24. B	39. D	54. C	
10. D	25. B	40. C	55. A	
11. D	26. D	41. B	56. A	
12. A	27. D	42. B	57. A	
13. A	28. C	43. C	58. B	
14. A	29. A	44. C	59. A	
15. C	30. C	45. C	60. B	

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Paper- 2

Public Health

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Chapter 11

Janapadodhwamsa/Maraka Vyadhi

Syllabus

Causes of Janapadodhwamsa/ Maraka Vyadhi. Manifestation and control measures of Janapadodhwamsa. Principles and uses of epidemiology. Dynamics of disease transmission. Theory of disease causation - epidemiological triad and natural history of disease. Concept of prevention, modes of intervention, risk factors, incidence and prevalence. Susceptible host and host defence. Immunizing Agents. Concept of Vyadhikshamatwa. Investigation of an epidemic. Prevention and control of an epidemic. Sankramaka Roga as per Ayurveda.

Learning objectives

1. Understanding the Epidemic Diseases (Amendment) Ordinance Act,2020
2. Explain the causes of Janapadodhwamsa/ maraka vyadhi State the manifestation and control measures of Jnapadodhwamsa Explain the importance of Panchakarma and Rasayana in preventing Janapadodhwamsa
3. Define Epidemiology, enumerate and describe the principles and uses of epidemiology.
4. Describe the basic terms of epidemiology. Explain and discuss the dynamics of disease transmission. Explain the theory of disease causation, epidemiological triad and natural history of disease.
5. Explain the concept of prevention, modes of intervention, risk factors, incidence and prevalence.
6. Explain Susceptible host and host defense. Describe Immunizing Agents. Explain the concept of vyadhikshamatwa. Enlist methods to improve Vyadhikshamatwa. Classify Bala, enlist factors of Bala vriddhikara bhava.
7. Explain the investigation of an epidemic. Explain prevention and control of an epidemic.
8. Explain Sankramaka roga as per Ayurveda.

Total - 47 hours (Lecture :37 hour, Non-lecture: 10 hours)
MCQ- Yes- SAQ (5 Marks)- Yes- LAQ (10 Marks)- Yes

Causes of Janapadodhwamsa/ Maraka Vyadhi. Manifestation and Control Measures of Janapadodhwamsa

Janapadodhwamsa

Janapada- large population, community.

Udhwasa- Destruction of community.

Natural calamities of high magnitude such as floods, famine, cyclone etc. leads to mass destruction. Apart from these calamities, diseases can also lead to such destruction on a mass scale. Such destruction is termed as Janapadodhwamsa.

जनपदानां, जनसमूहानांउध्वंसनमइतिजनपदोदध्वसं ।
(जल्पकल्पतरु)

The diseases which produce destruction of large population called Janapadodhwamsa.

जनपद- जनस्यलोकस्यंपदंआश्रय स्थानंतत्रजनपदं, जनपदानांसंमूहं ।

जनपद- Group of people living in a specific location.

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उध्वंस- means destruction

Epidemiology-(Epi- among. Demos- people, logas-study)

Definition of epidemiology

Epidemiology is the study of the distribution and determinants of health-related states or events (including disease) and the application of this study to the control of diseases and other health problems. Epidemiology is the science that studies the patterns, causes, and effects of health and disease conditions in defined populations.

Janapadodhwamsa- Situation involving the destruction or death of a large population spread over a small locality, or a country or a part of world or even the entire world.

Disease as per Chakrapani: Chakrapani, the commentator of Charaka Samhita says that even though the individuals have difference in physical constitution, food habits, suitability, strength, immunity, age etc. still there are such factors as are common to all individuals and the vitiation of these factors leads to the simultaneous manifestation of diseases having the same set of symptoms leading to the destruction of countries. The factors which are common for all the inhabitants of a country are air, water, land and season.

द्विविधोहेतुर्व्याधिजलकः प्रणिनांभवतिसाधारणः असाधारणश्चः तत्रसाधारणंप्रतिपुरुषनियतं वातादिजलकमाहाराद्यभिधायबहुजलसाधारणंवात जल देश काल रुपम् साधारण वेगकारनमभिधातुं जनपदोध्वंसनीऽयोभिधीयते ।

(चक्रपाणि टिका च.वि. 3/1-2)

1. असाधारणहेतु
   - Pertaining to the individuals.
   - Causing Doshaja Vyadhi's.
2. साधारणहेतु
   - Each individual take such as diet etc. influencing the states of Doshas.

Cause of a vitiated environment "Adharma"

- Deviation from stipulated behaviour meant for protection and well-being of both society and individual.
- As this chain of disobedience increases from rulers to his citizens, its intensity increases.
- Its effects are then reflected in material world and super natural forces.
- Leading to disturbance in Rutucharka and vitiation of Jala, Desha, Vayu and Kala.

Dharma as per Ayurveda

- Following regimens in Dinacharya and Rutucharya;
- Sadvritta's like Homa, Satya, Pranidya, Dana, Bali, Upaharasa etc.
- In olden days, the frequent Yajnas helped in formation of clouds and purification of environment.
- Dharmacharana leads to Arogya and Harsha.

Prajnaparadha

- Cause of Adharmacharana
- Caused by increased Rajas and Tamas; greed and selfishness; jealousy and anger.
- Leads to disturbance in physical and mental peace of the community and people are susceptible to diseases.

Etiological factors of Janapadodhwamsa As per Charaka

1. नियतातंकपर्यायहेतु
2. अनियतातंकपर्यायहेतु

Charaka has divided the etiological factors into Niyata Hetu and Aniyata Hetu.

Niyata Hetu-The NiyataHetu are the inevitable disastrous factors includes the harmful effects of sun, moon, stars and planets such as floods, cyclones, landslides, earth quakes, tsunami etc.

Aniyata Hetu-Whereas the Aniyata Hetu are the evitable disastrous factors includes Prajnaparadhaja (terrorism, accidents etc), Shastra Prabhavaja(wars - nuclear weapons, missiles etc advanced weapons), Abhisyangaja (effects of pathogens, evil forces & unhygienic condition) and Abhishapaja (curse). All these factors not only influence the individuals but also the society leading to destruction of community and even the responsible for the disease-causing organisms.

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Shastra Prabhava (War) - Destruction of men and materials on massive scale.Usage of atom bomb and bio-weapons (like anthrax) destroyed population and had disastrous effects. These will results into spread of epidemics. Such diseases are termed as Janapadodhwansa Rogas.

They are Vayu (air), Udaka (water), Desha (place) and Kala (time/seasons) and vitiation of these factors leads to the simultaneous manifestations of diseases having Samana Linga/ Tulya Linga (the same set of symptoms) leaving to the destruction of a country.

Janapadodhwamsakara Bhava (Nature of the vitiated factors)

ते तु खल्विमे भावाः सामान्या जनपदेषु भवन्ति; तद्यथा- वायुः, उदकं, देशः, काल इति । (च.वि. 3/6)

They are - Vayu (air), Udaka (water), Desha (place) and Kala (time/seasons) and vitiation of these factors leads to the simultaneous manifestations of diseases having Samana Linga/ Tulya Linga (the same set of symptoms) leaving to the destruction of a country.

Vayu (Air)

तत्र वातमेवंविधमनारोग्यकरं विद्यात; तद्यथा- यथर्तुविषममतिस्तिमितमतिचलमतिपरुषमतिशीतमत्युष्णमति-रूक्षमत्यभिष्यन्दिनमतिभैरवारावमतिप्रतिहत परस्परगतिमति-कुण्डलिनमसात्म्यगन्धवाष्पसिकतापांशुधूमोपहतमिति ॥ (च.वि. 3/6(1)

Air with following characteristics is injurious to health. Atistimitam (excessive calmness), Atichalam (violent blows), Atiparucam (excessive dryness), Atishita (cold), Atyuch Gam (hot air), Atiruksham (rugh), Atyabhishyandinam (humidity), Atibhairavara Atipatihata (excessive clashes among each other wind blowing from one direction clashing with the one from the other) Paraspara Gatim Atikundalina (excessively cyclonic in nature) and Asatmya Gandha, Baspa Sikata Pamshu Dhumapahatamiti (association with unwholesome smell, gases, sand, ashes and smoke).

Jala (Water)

उदकं तु खल्वत्यर्थविकृतगन्धवर्णरसस्पर्शं क्लेदबहुलम-पक्रान्तजलचर विहङ्गमुपक्षीणजलेशयम प्रीतिकरमपगतगुणं विद्यात॥ (च.वि. 3/6(2)

Dushita Jala (polluted water) having the following characteristics is considered to devoid of its normal attributes Vikruta Gandha Varna Rasa Sparsham (abnormal smell, color, taste and touch), Kleda (excessive stickiness), Bahulampakranta Jalachara Vihangamupakshina (absence of aquatic birds), Jaleshayam Pritikaram Apagata Gunama Vidyata (reduction in the number of aquatic animals) and Apaparitikaram Apagata Gunama (unpleasantness).

Desha (Land)

देशं पुनः प्रकृतिविकृतवर्णगन्धरसस्पर्शं क्लेदबहुलमुपसृष्टं सरीसृपव्यालमशकशलभमक्षिकामूषकोलूकश्माशानिकशकु-निजम्बूकादिभिस्तृणोलूपोपवनवन्तं प्रतानादिबहुलमपूर्ववदव-पतितशुष्कनष्टशस्यं धूम्रपवनं प्रध्मातपतत्रिगणमुत्क्रुष्टश्व-गणमुद्भ्रान्तव्यथितविविधमृगपक्षिसङ्घमुत्सृष्टनष्टधर्मसत्यलज्जा-चारशीलगुणजनपदं शश्वत्क्षुभितोदीर्णसलिलाशयं प्रततोल्का-पातनिर्घातभूमिकम्पमतिभयारावरूपं रूक्षताम्रारुणसिताभ्रजाल-संवृतार्कचन्द्रतारकमभीक्ष्णं ससम्भ्रमोद्वेगमिव सत्रासरुदितमिव सतमस्कमिव गुह्यकाचरितमिवाक्रन्दितशब्दबहुलं चाहितं विद्यात ॥ (च.वि. 3/6(3)

Land having the following characteristics is considered to be harmful, Prakruti Vikruta Varna Gandha Rasa Spasham (abnormal color, smell, taste and touch), Kleda Bahulam (excessive moisture), Apasrushta Sari Srupa Vyala Mashaka Shalabha Makshika Musha Oluka Shmashanika Shakuni Jambukadibhi Struno Lupo Pavanavantam (Abundance of serpents, wild animals, mosquitoes, locusts, flies, rats, owls, vulture and jackal), Pratanadi Bahulam (Having excess of grass and weeds), Apurvavad Avapatita (Abundance of excessively branched creepers), Sushka Nashta Shasyam(withered dried), Dhumra Pavanam (Abundance of smoke in the wind); presence of wild cries of birds, dogs gets confused and pain in animals as well as birds. Utsrushta Nasta Dharma (the inhabitants of community have either given up or lost virtue), Satya (truthfulness), Lajjachara (modesty), Shila Guna Janapadam (conduct, behavior and other qualities;) Shashvatkshutodirna Salilashayam (water reservoirs are constantly agitated or overflowing), Pratatolkapata Nirghata Bhumikampa Ati Bhata Rupa (there is frequent

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occurrence of meteorites, thunderbolts, and earthquake; frequent appearance of fierce objects and crys in nature), Rukha Tamra Aruna Sita Bhrajala Samvrutta Arka Chandra Tarakama Bhikshnam appearance of sun, moon and stars as rough, coppery, reddish, white and as if covered with cloud; (the atmosphere), Samabrama Udvega Satrasa Ruditamiva Satamaskamiva Guhya-kacharita Vakrandita Shad bda Bahula Chahita (filled with confusion, excitement, torture, violent lamentation and (covered with sheet of) darkness with frequent crying sound as if seized by Guhyaka (demon).

Kala (Seasons)

कालंतुखलुयथर्तुलिङ्गादविपरितलिङ्ग हीनलिङ्ग चाहितं-व्यवस्येत ॥ (च.वि. 3/6(4)

There can be Atiyoga/Hinayoga/Mithyayoga of seasons.

Importance of Panchakarma and Rasayana to preventing and control of Janapadodhwasa

विगुणेष्वपि खल्वेतेषु जनपदोद्ध्वंसकरेषु भावेषु भेषजेनोप-पाद्यमानानामभयं भवति रोगेभ्य इति ॥ (च.वि. 3/8)

चतुर्ष्वपि तु दुष्टेषु कालान्तेषु यदा नरा।
भेषजेनोपपाद्यन्ते न भवन्त्यातुरास्तदा ॥
येषां न मृत्युसामान्यं सामान्यं न च कर्मणाम।
कर्म पञ्चविधं तेषां भेषजं परमुच्यते ॥
रसायनानां विधिवच्चोपयोगः प्रशस्यते।
शस्यते देहवृत्तिश्च भेषजैः पूर्वप्तुदधृतैः ॥
सत्यं भूते दया दानं बलयो देवतार्चनम।
सदवृत्तस्यानुवृत्तिश्च प्रशमो गुप्तिरात्मनः ॥
हितं जनपदानां च शिवानामुपसेवनम।
सेवनं ब्रह्मचर्यस्य तथैव ब्रह्मचारिणाम ॥
संकथा धर्माशास्त्राणां महर्षीणां जितात्मनाम।
धार्मिकैः सात्विकैर्नित्यं सहास्या वृद्धसंमतैः ॥
इत्येतदभेषजं प्रोक्तामायुषः परिपालनम।
येषामानियतो मृत्युस्तस्मिन काले सुदारुणे ॥
(च.वि. 3/12-18)

Epidemic diseases are not being afraid of diseases, if he is assured of proper medication for administration.

One does not suffer from the disease even while all these four vitiated factors ending with seasons are at work if he is administration medicines properly. Those who are not having identical actions during the previous life and those who are not destined to die during the epidemics, for their cure, Panchakarma (five elimination therapies) are the best. They should be properly administered Rasayana Chikitsa (rejuvenation therapy) and physical health should be maintained with such drugs as are collected before the onset of epidemics.

Truthfulness, compassion for living beings, charity, scarifies, prayer to the gods, adoption of preventive measures, tranquillity, protection of the self by Mantra etc. for things as are good for the self, residence in auspicious localities, observance of Brahmacharya, service to those observing Brahmacharya, discussion of religious scriptures, great sages and those who have self-control, and constant associated with religious, Satvika and learned persons these are the therapies which if adopted during the epidemics can easily save the lives of individuals provided the death of a particular individual during the period is not predestined.

Principles and uses of Epidemiology

Epidemiology is a scientific study of factors and conditions related to disease as they occur in people. The word epidemiology is derived from epi (in, on, upon); demos (people) and logos (science). Formerly, epidemiology was considered to be a science of epidemics and its application was limited to prevention and control of a few communicable diseases such as cholera, smallpox, plague, etc. which occurred in epidemic form. Gradually, the epidemiological method of studying a disease by devoting attention to its occurrence and distribution, aetiology, prevention and control was extended to communicable diseases in general. During last few decades, the epidemiological approach has been used in the study of non-communicable diseases also, such as hypertension, coronary artery disease, diabetes, cancer, mental disorders and even accidents and burns. As a result, diseases are now broadly classified into two groups- communicable and non-communicable- for the purpose of epidemiological study.

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Definitions

- It is an orderly study of incidence in human society of any morbid state (communicable and non-communicable disease, accidents, injuries and abnormalities of medical importance).
- It is a study of the role of the agent, host and environment in the natural history of disease.
- It is the study of relationship among various factors and conditions in the agent, host and environment that determine the frequency of occurrence and distribution of an infectious process; a disease or a physiological state in a population.
- According to Lilienfeld, "Epidemiology is the study of the distribution of a disease or a physiological condition in human populations and of the factors that influence this distribution".
- Oxford English dictionary - The branch of medical science which treats epidemics.
- Kuller LH: American J of Epidemiology- Epidemiology is the study of "epidemics" and their prevention.
- Anderson G. In: Rothman KJ: Modern Epidemiology- the study of the occurrence of illness.
- Branch of medical science which treats of epidemics. (Park in,1873)
- Study of the occurrence and distribution of health-related diseases or events in specified populations, including the study of the determinants influencing such states, and the application of this knowledge to control the health problem.(John M. Last in 1988).

Objectives of Epidemiology

1. To know the distribution of the disease in the community
2. To know the magnitude of the problem
3. To identify the etiological and risk factors in the development of disease
4. To plan for the implementation of prevention and control measures
5. To eliminate or eradicate the disease
6. To evaluate the control measures
7. Ultimate objective is to promote the health and wellbeing of the people.

Uses of Epidemiology-

1. To study historically the rise and fall of diseases in population
2. To monitor continuously over a period of time the change of health in a community. (For example, the effects of a vaccination programme, health education, nutritional supplementation).
3. To make a community diagnosis. Epidemiology helps to identify and describe health problems in a community (for example, the prevalence of anaemia, or the nutrition status of children).
4. Planning and evaluation
5. Evaluation of individual's risks and chances
6. Syndrome identification
7. Completing the natural history of disease.
8. Searching for causes and risk factors

Terminology

Infection: The entry and development or multiplication of an infectious agent in the body of man or animals.

Contamination: The presence of infections agent on a body surface, also on or in clothes, beddings, toys, surgical instruments or dressings or other inanimate articles or substances including water, milk and food.

Infestation: For persons or animals the lodgment, development and reproduction or arthropods on the surface of the body or in the clothing (e.g) ice, itch mite.

Host: A person or other animal including birds and arthropods that affords subsistence or lodgment to an infectious agent under natural condition.

Communicable diseases: An illness due to specific infections agent or its toxic products capable of being directly or indirectly transmitted from man to man, animal to animal or from the environment to man or animal.

Epidemic: The unusual occurrence or sudden

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outbreak of disease in a community or region.

Endemic: It refers to the constant presence of a disease or infections agent within a given geographic area or population group.

Sporadic: The word sporadic means scattered about. The diseases are so few and separated widely in space.

Pandemic: An epidemic usually affecting a large proportion of the population, occurring over a wide geographic area such as a section of a nation.

Zoonosis: An infection or infections disease transmissible under natural conditions from vertebrate animals to man.

Eradication: Termination of all transmission of infection by extermination of infections agent through surveillance and containment.

Carriers: A carrier is defined as "an infected person or animal that harbours a specific infections agent in the absence of clinical manifestation but potentially source of infection.

Incubation period

"The time interval between the attack of an infectious agent and appearance of the first sign or symptom of the disease" is incubation period.

Generation time

"The interval of time between control of infection by a host and maximal infectivity of the host" is generation time.

Communicable periods

"The time during which an infectious agent may be transferred directly or indirectly from an infected person to another person, from an animal including arthropods".

Secondary attack rate

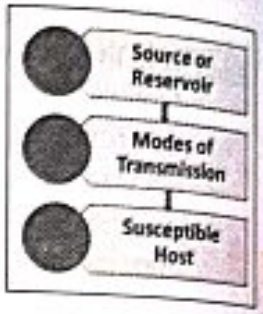
"The number of exposed persons developing the diseases within the range of the incubation period following exposure to the primary case".

Immunity: Protection against infections

Immune system: Molecules, cells and tissues that mediate responses to foreign substances

Antigens: Substances recognized by the cells and molecules of the immune system and to which the system responds. There is a phase of passive immunity transmitted to the baby from the mother across the placenta. Maternal antibody transmitted to infant is gradually lost a period of 6 months.

Dynamics of Disease Transmission



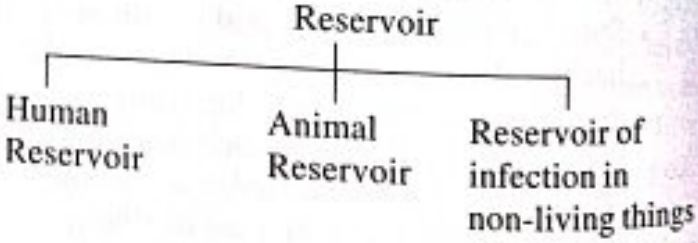
Communicable diseases are transmitted from the reservoir /source of infection to susceptible host. Basically there are three links in the chain of transmission, viz, the reservoir, modes of transmission and the susceptible host.

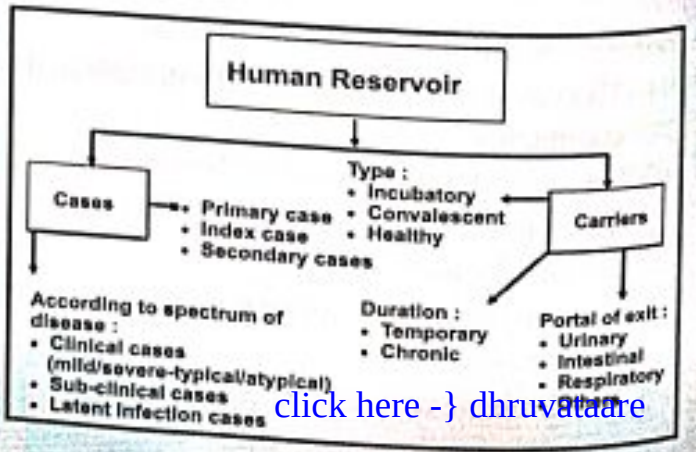
Source and reservoir of infection

The **Source** of infection is defined as "the person, animal, object or substance from which an infectious agent passes or is disseminated to the host".

A **Reservoir** is defined as "any person, animal, arthropod, plant, soil, or substance in which it depends primarily for survival and where it reproduces itself in such manner that it can be transmitted to susceptible host".

Types of Reservoir of Infection





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Human reservoir of infection

The most Important source and reservoir of infection for human is man himself he may a case or carrier.

Cases

Itis defined as "a person in the population or study group identified as having the particular disease, health disorder, or condition under investigation".

Clinical illness may be mild or moderate, typical or atypical, severe or fatal depending upon the gradient of involvement. Subclinical cases are variously referred to as in apparent, convert, missed or abortive cases. They are equally important as source of infection. They play important role to maintain the chain of infection. In diseases like Rubella, mumps, polio, hepatitis A and B, Japanese encephalitis etc. subclinical cases are common.

Latent infection, the host does not shed the infection.

Primary case- it is refer to the first case of communicable disease introduced into population unit being studied.

Index case- the term index case is the first case to come to notice of the investigator.

Secondary cases- are those developing from contact with primary case.

Infection Carrier

It occurs either due to inadequate treatment or immune response, the disease agent is not completely eliminated, leading to a carrier state.

It is "an infected person or animal that harbours a specific infectious agent in the absence of discernible (visible) clinical disease and serves as a potential source of infection to others.

Carrier may be classified as below

A. Type

1. **Incubatory -** Is the one who is spreading the disease during the incubation period-itself (i.e. before the onset of the disease itself). Example- measles, mumps diphtheria, poliomyelitis, pertussis, influenza and hepatitis A and B.
2. **Convalescents -** Is the one who is acting as a carrier during the period of convalescence (recovery) from an illness. That means such a person is getting cured clinically but not bacteriologically, may be due to incomplete course of treatment. Such a state occurs in conditions. Example- diphtheria, typhoid fever, amoebiasis.
3. **Healthy -** Is the one who is subclinically infected and acts as a source of infection to others. The nursing staff, the patient's attendants or the family members who are in close association with the cases often become healthy carriers. They never suffer from the disease. Example- poliomyelitis, cholera, diphtheria etc.

B. Duration

1. **Temporary -** These are those who are acting as carriers and spreading the disease for a short period of time (for several days). All incubatory, convalescent and healthy carriers are temporary carriers.
2. **Chronic-** These are those who are transmitting the disease for a long period of time, several weeks to several months. Example- typhoid fever, tonsils in diphtheria, liver in hepatitis B,

C. Portal of exit/ Route of exit

1. Urinary carriers, where the focus of organisms is the kidney as in typhoid
2. Intestinal carriers, where the focus of organisms is the intestine, as in typhoid, amoebiasis
3. Biliary carriers, where the focus of organisms is the gallbladder as in typhoid
4. Cutaneous carriers as in staphylococci
5. Nasal carriers as in nasal diphtheria
6. Genital carriers as in gonorrhea, AIDS.

Animal reservoir of infection-

Zoonosis is an infection that is transmissible under natural conditions from vertebrate animals to man, example- rabies, plague, bovine tuberculosis, influenza etc. There are over 100 zoonotic diseases that can be conveyed from animal to man.

Zoonotic diseases can also be classified as viral,

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bacterial, parasitic and rickettsial diseases.

1. **Viral:** Rabies, yellow fever, dengue fever, Japanese encephalitis, KFD.
2. **Bacterial:** Salmonellosis, brucellosis, leptospirosis, plague.
3. **Parasitic:** Teniasis, hydatid disease, leishmaniasis.
4. **Rickettsial diseases:**

a. Typhus group: Rickettsial zoonoses, epidemic typhus, scrub typhus: Murine typhus

b. Spotted fever group: Tick typhus, Rocky Mountain spotted fever, Rickettsial pox

c. Others: Q fever, trench fever.

Reservoir in non- living things

Soil and inanimate matter can also act as reservoir of infection. For example, soil may harbour agents that cause tetanus, anthrax, gas-gangrene, ankylostomiasis, anthrax, malignant edema, aspergillosis.

Mode of Transmission/ Routes of Transmission

Communicable diseases may be transmitted from the reservoir/source to the susceptible host in many different ways.

Mode of Transmission

- Direct Transmission
  - Direct contact
  - Droplet infection
  - Contact with soil
  - Inoculation into skin of mucose
  - Trans-placental vertical
- Indirect Transmission
  - Vehicle borne
  - Vector borne
    1. Mechanical
    2. Biological
  - Air Borne
    1. Droplet Nuclei
    2. Dust
  - Formite-borne
  - Unclean hands and fingers

Direct transmission

1. **Direct contact-** Infection may be transmitted by direct contact from skin to skin, mucosa to mucosa to skin of the same or another person. Example- skin to skin contact as touching, kissing, sexual intercourse - STD, AIDS, Leprosy, Skin and eye infection.
2. **Droplet infection-** This is direct projection of a spray of droplet, saliva and naso-pharyngeal secretion during coughing, sneezing, speaking, spitting into surrounding atmosphere. Disease transmitted by droplet spared includes may RTI, eruptive fever, common cold, diphtheria, tuberculosis etc.
3. **Contact with contaminated soil-** The disease agent may be inoculated directly into skin or mucosa e.g. rabies, dog bite, hepatitis B, virus through contaminated needle and syringes.
4. **Contact with animals-** Classical example is rabies transmitted from a rabid animal by bite and inoculating the virus into the skin or mucous membrane.
5. **Trans placental or vertical-** Infectious agents spread through placenta to the fetus e.g. Torch, Toxoplasma gandii, Rubella, Syphilis, Hepatitis B, HIV etc.

Indirect transmission

The spread mainly takes places by 5F's (flies, finger, fomites, food and fluid)

1. **Vehicle borne-** Infection is spread through vehicle like water, food (raw vegetables, fruits, milk and milk products), ice, blood, serum, plasma or other biological products such as tissues and organs. Example-acute diarrheas, typhoid fever, cholera, polio, hepatitis A.
2. **Vector borne-** Vector is defined as an arthropod or any living carrier the infectious organisms. Example- Malaria, filarial, dengue, mice etc.
3. **Air borne -** Droplet nuclei- Droplet uncles are a type of particles implicated in the spread of air borne infection. They are tiny particles (1-10microns) and dried residue of droplets, duet, larger droplets, expelled may settle down on floor and become a part of environment e.g. tuberculosis, pnumonia, Q-fever.

Dust- some of the large droplets which are expelled during talking, coughing or sneezing, settle down by their sheer weight on the floor, carpets, furniture, clothes, bedding, linen and

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other objects in the immediate environment and become part of the dust, e.g. streptococci, viruses and fungal spores.

4. Fomite borne- Fomites are non-living articles or substance other than water and food contaminated by the infectious discharges from patient and transfer the infectious agent to a healthy person. Example- clothes, towels, hand kerchiefs, cups, spoons, pencils, books etc.

5. Unclean hands and fingers- Hands are the most common medium by which pathogenic agents are transferred to food from the skin, nose, bowel etc. as well as from other foods Example- staphylococcal, streptococcal infections, dysentery.

Theory of Disease Causation

Disease is easier to appreciate and less abstract than health. Whereas health denotes a perfect harmony of the different body systems, disease denotes an aberration of this harmony. This aberration may range from a biochemical disturbance to severe disability or death. Even a psychological dysfunction may be classified as disease. It is important to understand the difference between the terms disease and illness. Disease may be defined as the bio physiological phenomena which manifest themselves as changes in and malfunction of the human body. Illness, on the other hand, is the experience of being sick. Disease refers to occurrence of something, i.e. body changes and malfunction. Illness refers to experience of something, i.e. being sick. Profound changes and malfunction may occur in the body without their being experienced by the patient.

A classical example is hypertension, labelled as "the silent killer". Blood pressure may be markedly increased, yet an individual may not have any symptoms. Such a person has hypertensive disease, but he does not feel he has any illness. Conversely, a person may feel ill without having a disease. For example, snake bite by a non-poisonous snake may result in palpitation, perspiration, fainting and even death. The reason is that strong emotion or belief, in this case about the snake being poisonous, can result in illness. Another example is that of a person fainting or going into trance or frenzy under the belief that he is possessed by a spirit. Thus people may feel ill in the absence of disease, just as they can have disease without feeling ill.

Definition of disease-

Webster- "a condition in which body health is impaired, a departure from a state of health, an alteration of the human body interrupting the performance of vital functions".

Oxford English dictionary- "a condition of the body or some part or organ of the body in which its functions are disrupted or deranged".

WHO defined health but not disease. This is because disease has many shades ranging from in apparent cases to severe manifest illness.

Definition of disease Ecological Definition.: Maladjustment of the human organism to the environment Sociological: disease is a social phenomenon, occurring in all societies defined and fought in terms of particular cultural forces prevalent in the society.

Types of diseases

1. Acute - food poisoning
2. Insidious onset - mental illness, rheumatoid arthritis
3. Carrier state - outwardly healthy but capable of infecting others - typhoid fever
4. One organism causing multiple types of manifestations - streptococcus.
5. Same disease caused by multiple organisms - diarrhoea.
6. Disease with short or long course.
7. Disease - physiological/psychological dysfunction
8. Illness - subjective state of the person who feels aware of not being well
9. Sickness - state of social dysfunction; a role a person assumes when he/she is ill - sickness role.

Although many diseases are infectious, research

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in the twentieth century has revealed other kinds of cause of disease: genetic, nutritional, immunological, metabolic, and cytological.

Concept of Causation

- Supernatural theory of disease
- Germ Theory - Louis Pasteur, Robert Koch
- Epidemiological Triad
- Multi Factorial Theory - Web of disease causation, Wheel of causation

Supernatural theory of disease: In the early past, the disease was thought mainly due to either the curse of god or due to the evil force of the demons. Accordingly, people used to please the gods by prayers and offerings or used to resort to witchcraft to tame the devils.

Germ Theory (Robert Koch)- Microbes (germs) were found to be the cause for many known diseases. Pasteur, Henle, Koch were the strong proponents of microbial theory after they discovered the micro-organisms in the patients' secretions or excretions.

Germ Theory of disease- Germ Theory of disease Microbes as the cause of disease One to one relationship b/w causal agent and disease

Disease agent → Man → Disease

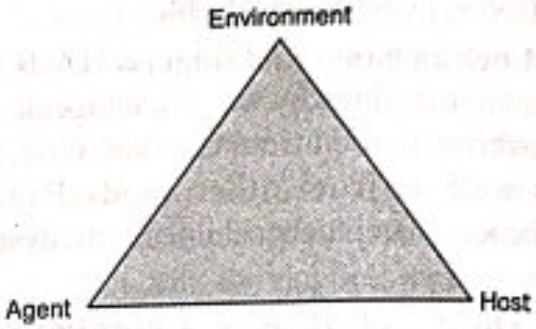
Germ theory of disease - Koch's postulates: Organisms must be constantly a/w the lesions of the disease Organism must be isolated from pure culture of the lesion Inoculation of the material of pure culture in suitable animal should produce the lesions of the disease It should be possible to isolate the organism in experimental animals from the culture material.

Disease rarely caused by a single agent alone Most of the disease are dose related, subclinical and w/o symptoms Number of factors contribute to the occurrence of disease - relating to host and environment Not everyone exposed to the Microbes develop the disease.

Ecological Theory: ecological theory around 463 BC, Hippocrates the first epidemiologist who advised to search the environment for the cause of the disease.

Environmental influence: environmental influence interactions among humans, other living creatures, plants, animals, microorganisms, ecosystems, and climate, geography, and topography.

Epidemiological Triad (Sankramakatraya)



The causative factor of disease may be classified as **Agent, Host** and **Environment**. These three factors are transferred as epidemiological triad. This presence of agent, host and favourable environment factors in the pre pathogenesis period is not sufficient to start the diseases in man. What is required is an interaction of these three factors to initiate the disease process in man. The combination of epidemiological triad denotes the distribution of disease, cause of diseases, and nature of disease or endemic or epidemic and risk factor of disease. Thus it helps in preventing the disease at primary level through health promotion, specific protection and at secondary level through early diagnosis and treatment. The knowledge of epidemiological triad is very much useful in prevention of communicable and non-communicable diseases.

Natural History of Disease

It means the evolution of a disease process in an individual, from its early stage to final stage of recovery or death, in the absence of any intervention such as prevention or treatment.

This differs from disease to disease and from person to person. Understanding the natural history of a disease is essential because knowledge of prevention can be applied at different phases of the

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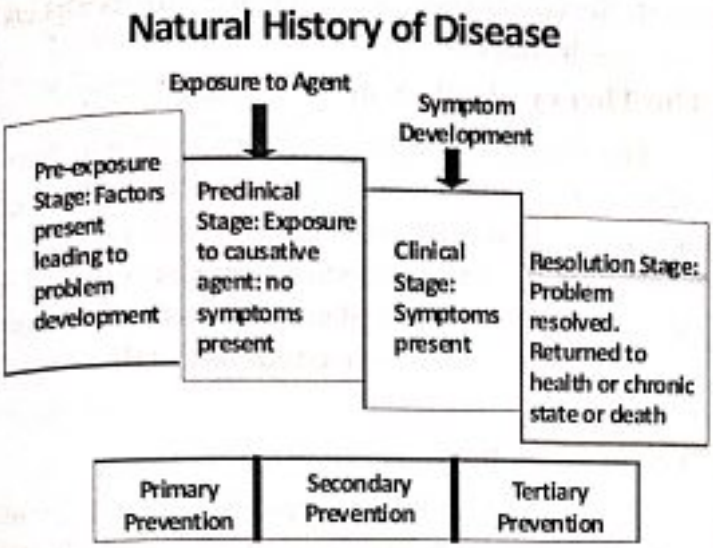
Natural History of Disease
Exposure to Agent
Symptom Development
Pre-exposure Stage: Factors present leading to problem development
Preclinical Stage: Exposure to causative agent: no symptoms present
Clinical Stage: Symptoms present
Resolution Stage: Problem resolved. Returned to health or chronic state or death
Primary Prevention
Secondary Prevention
Tertiary Prevention

disease process.

Agent Factors

The disease "agent" is defined as a substance, living or non-living, or a force, tangible or intangible, the excessive presence or relative lack of which may initiate or perpetuate a diseases process.

Classification of agents

1. **Biological agents-** These are living agents of disease i.e. viruses, bacteria, fungi, protozoa and metozoal etc.
   - **Infectivity** refers to the proportion of exposed persons who become infected.
   - **Pathogenicity** refers to the proportion of infected persons who develop clinical disease.
   - **Virulence** refers to the proportion of persons with clinical disease who become severely ill or die.
2. **Nutrient agents-** These can be protein, fats, carbohydrates, vitamins, mineral and water. An excess or deficiency of the intake of nutritive element may result in nutritional disorders e. PEM, Anemia, Goiter etc.
3. **Physical agents-** Expose to excessive heat, cold, humidity, pressure, radiation, electricity, sound, etc may result in illness.
4. **Chemical agents-** Endogenous chemical may be produced in the body as a result of derangement of function e.g. urea, serum bilirubin, ketones, uric acid, etc.

   Exogenous-agents outside of human host e.g. allergens, metals, fumes, dust gases, insecticides, etc.
5. **Mechanical agents-** Expose to chronic friction and other mechanical forces may result in crushing, tearing, sprains, dislocations and even death.
6. Absence or insufficiency or excess of a factor necessary to health.

   These may be chemical factors- hormones, oestrogens, enzymes
   - Nutrient factors- same as nutrient agents
   - Lack of structure - e.g. thymus
   - Lack of part of structure- e.g. cardiac defects
   - Chromosomal factors- e.g. mongolism, Turner's syndrome
   - Immunological factors- agammaglobulinemia
7. **Social agents-** These are poverty, smoking, abuse of drug, and alcohol, unhealthy life style social isolation, maternal deprivation etc.

Host Factors

In epidemiological terminology, the human host is referred to as "soil" and the disease agent as "seed". A person or other living animal that affords subsistence or lodgment to an infectious agent under natural condition.

- Host factors: Intrinsic factors that influence an individual's exposure, susceptibility, or response to a causative agent.
- Demographic characteristic such as age, sex, ethnicity
- Biological characteristic such as genetic, factors, biochemical levels of the blood, blood groups, enzymes etc.
- Social and economic characteristics like education, Scio-economic status, occupation, stress mental status, housing etc.

Environment Factors

- **Physical environment-** Nonliving things and physical factors (air, water, soil, housing, heat, light, etc.)
- **Biological environment-** Microbial agents,

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insects, animals, plants and man himself.

- **Psychosocial environment-** Lifestyle, poverty, urbanization, community life, income, education, stress etc.

Disease Occurrence

Different diseases, in different communities, show different patterns of expected occurrence.

Endemic: habitual presence of a disease within a given geographic area.

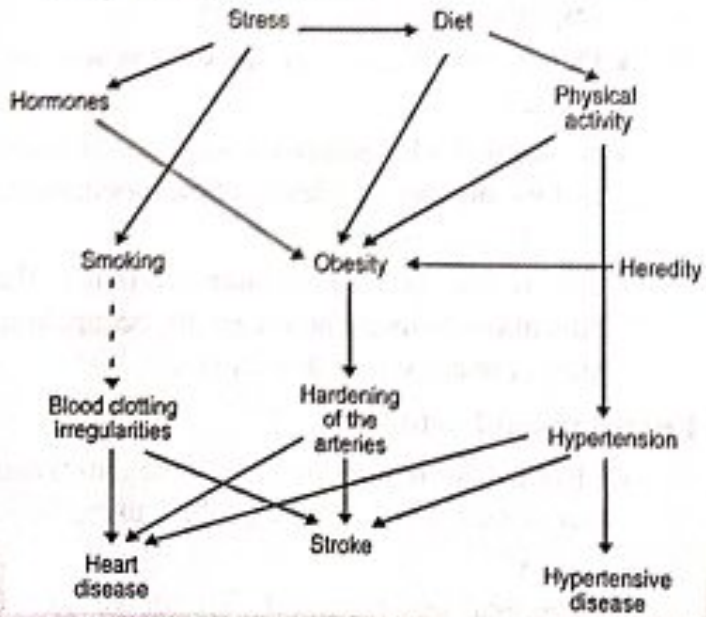
Hyper endemic: a persistently high level of occurrence.

Sporadic: an irregular pattern of occurrence, with occasional cases occurring at irregular intervals. (Prevalence is zero)

The "Beings" Model of Disease Causation

This concept postulates that human disease and its consequences are caused by a complex interplay of nine different factors -

1. Biological factors innate in a human being,
2. Behavioral factors concerned with individual lifestyles,
3. Environmental factors as physical, chemical and biological aspects of environment,
4. Immunological factors,
5. Nutritional factors,
6. Genetic factors,
7. Social factors,
8. Spiritual factors and



9. Services factors, related to the various aspects of health care services.

The Theory of "Web of Causation"

The "epidemiological triad theory" was very effectively used by Leavel and Clark in explaining the natural history of disease and levels of prevention for obviating such departures from the state of health. But it could not explain the causation of non-communicable diseases like IHD or road accidents.

Web of causation

McMahon and Pugh forwarded the theory of "epidemiological web of causation", wherein the various factors (e.g. hypercholesterolemia, smoking, hypertension) are like an interacting web of a spider. Each factor has its own relative importance in causing the final departure from the state of health, as well as interacts with others, modifying the effect of each other.

Concept of Prevention

The goals of medicine are to promote health, to preserve health, to restore health when it is impaired, and to minimize suffering and distress. successful prevention depends upon a knowledge of causation, dynamics of transmission, identification of risk factors and risk groups, availability of prophylactic or early detection and treatment measures, an organisation for applying these measures to appropriate persons or groups. The concept of prevention is best defined in the context of levels, traditionally called primary, secondary and tertiary prevention. A fourth level, called primordial prevention, was later added.

Level of prevention-

Preventable Causes of Disease (**BEINGS**)-

- Biological factors and Behavioural Factors
- Environmental factors
- Immunologic factors
- Nutritional factors
- Genetic factors

Services, Social factors, and Spiritual factors

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1. Primordial prevention
2. Primary prevention
3. Secondary prevention
4. Tertiary prevention

1. Primordial prevention

Primordial prevention consists of actions and measures that inhibit the emergence of risk factors in the form of environmental, economic, social, and behavioural conditions and cultural patterns of living etc.

It is the prevention of the emergence or development of risk factors in countries or population groups in which they have not yet appeared.

For example, many adult health problems (e.g., obesity, hypertension) have their early origins in childhood, because this is the time when lifestyles are formed (for example, smoking, eating patterns, physical exercise).

In primordial prevention, efforts are directed towards discouraging children from adopting harmful lifestyles.

The main intervention in primordial prevention is through individual and mass education.

2. Primary prevention

Primary prevention can be defined as the action taken prior to the onset of disease, which removes the possibility that the disease will ever occur. It signifies intervention in the pre-pathogenesis phase of a disease or health problem. Primary prevention may be accomplished by measures of "Health promotion" and "specific protection".

It includes the concept of "positive health", a concept that encourages achievement and maintenance of "an acceptable level of health that will enable every individual to lead a socially and economically productive life".

Primary prevention may be accomplished by measures designed to promote general health and well-being, and quality of life of people or by specific protective measures.

Health promotion is "the process of enabling people to increase control over the determinants of health and thereby improve their health".

Approaches for Primary Prevention- The WHO has recommended the following approaches for the primary prevention of chronic diseases where the risk factors are established:

a. Population (mass) strategy

b. High -risk strategy

Population (mass) strategy -"Population strategy" is directed at the whole population irrespective of individual risk levels. For example, studies have shown that even a small reduction in the average blood pressure or serum cholesterol of a population would produce a large reduction in the incidence of cardiovascular disease. The population approach is directed towards socio-economic, behavioural and lifestyle changes.

The high -risk strategy aims to bring preventive care to individuals at special risk.

High -risk strategy- This requires detection of individuals at high risk by the optimum use of clinical methods.

3. Secondary Prevention

It is defined as "action which halts the progress of a disease at its incipient stage and prevents complications."

The specific interventions are: early diagnosis (e.g. screening tests, and case finding programs) and adequate treatment.

Secondary prevention attempts to arrest the disease process, restore health by seeking out unrecognized disease and treating it before irreversible pathological changes take place, and reverse communicability of infectious diseases.

It thus protects others from in the community from acquiring the infection and thus provides at once secondary prevention for the infected ones and primary prevention for their potential contacts.

Secondary prevention attempts to arrest the disease process, restore health by seeking out unrecognized disease and treating it before irreversible pathological changes take place, and reverse communicability of infectious diseases. It

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thus protects others from in the community from acquiring the infection and thus provides at once secondary prevention for the infected ones and primary prevention for their potential contacts.

Early diagnosis and treatment- WHO Expert Committee in 1973 defined early detection of health disorders as "the detection of disturbances of homoeostatic and compensatory mechanism while biochemical, morphological and functional changes are still reversible." The earlier the disease is diagnosed and treated the better it is for prognosis of the case and in the prevention of the occurrence of other secondary cases.

4. Tertiary Prevention -

It is used when the disease process has advanced beyond its early stages. It is defined as "all the measures available to reduce or limit impairments and disabilities, and to promote the patients' adjustment to irremediable conditions." Intervention that should be accomplished in the stage of tertiary prevention is disability limitation, and rehabilitation.

Modes of Intervention

Intervention can be defined as any attempt to intervene or interrupt the usual sequence in the development of disease in man. This may be by the provision of treatment, education, help or social support.

Five methods of intervention:

1. Health promotion
2. Specific protection
3. Early diagnosis and prompt treatment
4. Disability limitation
5. Rehabilitation

1. Health promotion- "The process of enabling people to increase control over and to improve health". It is not directed against any particular disease, but is intended to strengthen the host through a variety of approaches (intervention).

In health promotion the Interventions include:

i. Health education:
ii. Environmental modification
iii. Nutritional interventions
iv. Lifestyle and behavioural changes

i. **Health education:** It is cost effective approach. Many diseases can be prevented with little or no medical intervention if people are informedand encouraged to take necessary precautions against these diseases.

ii. **Environmental modification:**

- Provision of safe water supply
- Sanitary latrines installation
- Insect and rodent control
- Improvement of housing

iii. **Nutritional interventions:**

- Food distribution and nutritional improvement of vulnerable groups.
- Proper weaning practices / child feeding programme.
- Food fortification.
- Nutrition education - balanced diet.

iv. **Life Style and behavioural changes :**

- Health education is the basic element of all health activity. It is of paramount importance in changing the views, behaviour and habits of people.
- Encouraging physical activity, hygiene and healthy life styles
- Discouraging smoking, physical inactivity, addiction
- Modifying diet patterns.

2. Specific protection- To avoid disease altogether is ideal but this is possible only in a limited number of cases. Currently available interventions includes:

a) Immunization
b) Use of specific nutrients
c) Chemoprophylaxis
d) Protection against occupational hazards
e) Protection against accidents
f) Protection from carcinogens
g) Avoidance of allergens
h) Better environmental conditions e.g. control of air and noise pollution
i) Control of consumer product quality and safety of foods, drugs, cosmetics, etc.

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3. Early diagnosis and prompt treatment : WHO expect committee defined it as "The detection of disturbances of homeostatic and compensatory mechanism while biochemical, morphological and functional changes are still reversible".

Interventions

1. Early diagnosis: better prognosis, better prevention of further occurrence of a disease/ long term disability.
2. Screening
3. Contact Tracing
4. Individual exam (History, GPE, lab investigation)
4. Disability limitation-

When a patient report late in the pathogenesis phase, the mode of intervention is disability limitation.

Objective- To halt the transition of the disease process from impairment to handicap.

Disease → Impairment → Disability → Handicap

Impairment is "any loss or abnormality of psychological, physiological or anatomical structure or function.

Disability is "any restriction or lack of ability to perform an activity in the manner or within the range considered normal for the human being."

Handicap is termed as "a disadvantage for a given individual, resulting from an impairment or disability that limits or prevents the fulfilment of a role in the community that is normal (depending on age, sex, and social and cultural factors) for that individual."

5. Rehabilitation- Rehabilitation is "the combined and coordinated use of medical, social, educational, and vocational measures for training and retraining the individual to the highest possible level of functional ability." It includes all measures aimed at reducing the impact of disabling and handicapping conditions and at enabling the disabled and handicapped to achieve social integration (active participation of the disabled and handicapped people in the mainstream of community life).

- Medical rehabilitation: This is done through medical / surgical procedures to restore the anatomy, anatomical functions and physiological functions to as near normal as possible.
- Vocational rehabilitation: It includes steps involving training and education so as to enable the person to earn a livelihood.
- Social rehabilitation: This involves steps for restoration of the family and social relationships.
- Emotional and Psychological rehabilitation: This involves steps to restore the confidence, personal dignity and confidence.

Risk factors

This term is related to 'Agent-factors', because risk factors are significantly associated with the development of a disease, especially noncommunicable diseases, like coronary artery disease, cancer, peptic ulcer, mental illness, obesity, diabetes, etc.

A risk factor is defined as an attribute, may or may not be modifiable, which has a potential value as a predictor for the unfavourable outcome such as disease, disability or death but often absolute proof is lacking, example smoking as a risk factor for lung cancer. Smoking does not imply that lung cancer will occur and, in its absence, the disease will not occur. This risk factor can be modified by intervention or eliminated, thereby reducing the possibility of occurrence of disease. This is called 'Primordial prevention.'

Often the risk factors act synergistically in the same individual, example smoking and high serum cholesterol act synergistically and result in coronary heart disease. Modifiable risk factors are smoking, lack of exercise, obesity, serum cholesterol, etc. the nonmodifiable (immutable) risk factors are age, sex, genetic constitution, race, family history, etc.

The risk factors may characterize the environment also, such as air pollution, water contamination, substandard housing, etc. indicating the need for improving the quality of health

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services. The relation between the risk factor and the occurrence of the disease and also the degree of risk can be established with epidemiological studies such as case-control and cohort studies. The detection of risk-factor will help in applying the knowledge of prevention.

Disease	Risk factors
Coronary heart disease	Smoking, cholesterol, obesity. Lack of disease exercise, Type A personality
Diabetes	Obesity, lack of exercise, excessive food Consumption
Cirrhosis	Alcohol, decreased protein intake. of liver
Lung cancer	Smoking, ionizing radiation, asbestos dust, air pollution.
Stroke	High blood-pressure, elevated cholesterol level, smoking
Vehicular	Alcohol, non-use of seat belts, excessive accidents speed, roadway design

Incidence and Prevalence

Incidence - It is the occurrence of only NEW (fresh) cases of a specified disease in a given area, during a given period of time (minimum one year). It is expressed for 1000 population at risk.

$$\text{Incidence rate} = \frac{\text{No. of new cases of a specified disease in a given area during a given period of time}}{\text{Population at risk during that period}} \times 1000$$

For example, if 100 new cases of tuberculosis occur in a population of 1,00,000 in a year, the incidence rate would be:

$$\text{IR} = \frac{100}{1000} \times 1000 = 1 \text{ per } 1{,}000.$$

It will be seen from the above definition that incidence rate refers

a. only to new cases
b. during a given period (usually one year)
c. in a specified population or "population at risk", unless other denominators are chosen.
d. it can also refer to new spells or episodes of disease arising in a given period of time, per 1000 population.

Uses of Incidence Rate

The incidence rate, as a health status indicator, is useful for taking action

1. To control disease, and
2. For research into aetiology and pathogenesis, distribution of diseases, and efficacy of preventive and therapeutic measures.

Prevalence- The total number of all individuals who have an attribute or disease at a particular time (or during a particular period) divided by the population at risk of having the attribute or disease at this point in time or midway through the period.

$$\text{Prevalence rate} = \frac{\text{No. of all current cases (Old + New)}}{\text{Total population}} \times 100$$

Prevalence is of two types:

(a) Point prevalence

(b) Period prevalence

$$\text{Point Prevalence} = \frac{\text{No. of all current (Old + New) of a specified disease, existing at given point of time}}{\text{Total population}} \times 100$$

$$\text{Point Prevalence} = \frac{\text{No. of all current (Old + New) of a specified disease, existing at given point of time}}{\text{Estimated mid-year population at risk}} \times 100$$

Uses of Prevalence Rate

1. These repeated prevalence studies are used to evaluate the health/disease/infection status and trend of large populations;
2. Important for the planning of health services and for the detection of changes in the health

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situation over time. Examples are nutritional and household surveys in censuses.

Differences between Incidence and Prevalence

Incidence	Prevalence
Refers to occurrence of new cases only in a given area, during a given year.	Refers to existence of both old and new cases in a given area, during a given period/point of time
Incidence rate is expressed per 1,000 population at risk	Prevalence rate is expressed per 100 population at risk
Estimated from longitudinal studies.	Estimated from cross-sectional studies
Estimation requires exact knowledge of time of onset of disease.	Such knowledge is not required
Refers to acute cases having short incubation period.	Refers to chronic cases having long incubation period
Ex: Rabies, measles, Act GE, etc.	Ex: Tuberculosis, leprosy, etc
Related terms are attack rate and secondary attack rate.	Related terms are point prevalence and period prevalence
Incidence rate is an ideal measure to study the etiology of a disease	Prevalence is not an ideal measure to study the etiology of a disease
Incidence rate is more useful in formulation and testing the etiological hypothesis	Prevalence rate is useful to know the magnitude of the problem
Incidence rate helps to evaluate the control measures	Prevalence rate helps for health planning

Susceptible Host and Host Defence

Susceptible host

"A person or other animal including birds, arthropods, that gives shelter or place to a infectious agent under natural condition" is called as susceptible host.

Portal of entry may be respiratory route, alimentary route, per cutaneous route or genital route. There may be even more than one route of entry. For example, AIDS, Hepatitis B, etc.

A site of election means, a site (on organ) where the pathogen finds optimum favourable condition for its growth, development, multiplication and survival. It is called 'Target Organ'.

Defence mechanism is at three levels- anatomical protection by healthy and intact skin, chemical protection by gastric acidity, and biological protection by immunity.

Host defences - Host defences against infection are at once local and systemic, non-specific and specific, and humeral and cellular. It is difficult to identify any infectious agent that fails to stimulate multiple host defence mechanisms. The concept of overlapping host defences is crucial to our understanding of susceptibility to infection. This overlapping underlies the reasonable measure of good health in the face of an apparently significant host immune defect.

There is a phase of passive immunity transmitted to the baby from the mother across the placenta. Maternal antibody transmitted to infant is gradually lost over a period of 6 months. Thus a large proportion of infants remain free from potent infection up to 3 months, or even longer. There is good evidence that this protective "biological shield" is due to the presence of high levels of immunoglobulins IgM and especially IgG in the cord blood and plasma of infants born of immune mothers. It has been postulated that some other factors (breast milk, presence of fetal haemoglobulin), are also responsible for the transient protection of infants.

Immunizing Agents

The immunizing agents may be classified as vaccines, immunoglobulin's and antisera.

Vaccines

It is an immuno-biological substance designed to produce specific protection against a given disease.

Types

1. Live Vaccine- Live vaccines are prepared

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from live organisms. These organisms have been passed repeatedly in the laboratory in tissue culture or chick embryos and have lost their capacity to induce full blown disease but potent their immunogenicity.

Live vaccines should not be administered to person with immune deficiency diseases or to person whose immune response may be suppressed because of leukaemia, lymphoma, or malignancy or because of therapy with corticosteroids, antimetabolic agents, or radiation and pregnancy. Example- BCG and typhoid (bacteria), measles, oral polio, yellow fever, measles, rubella, mumps, chicken pox, influenza etc. (viral).

2. Inactivated or Killed Vaccine- In this type, the organisms are inactivated or killed by heat or chemicals like phenol, Beta-propriolactone. Usually they are given in multiple doses in the primary course (2 to 3 doses) followed by booster dose subsequently. Immunity lasts shorter than live-vaccines and reactions are also frequent. Thus compared to live-vaccines, killed vaccines are less safe, less effective, less potent with short lasting immunity, requiring multiple doses. Example- cholera, pertussis, rabies, hepatitis B, Japanese encephalitis, KFD etc. (viral) Organisms killed by heat or chemical, when infected into the body stimulate active immunity.

3. Toxoids- They are modified toxins. The toxins of the organisms are modified (detoxified) so as to maintain only antigenicity and not pathogenicity (toxicity). Thus, they are used as vaccines. They also require multiple doses in the primary course followed by booster doses. They are quite safe and effective. Example diphtheria toxoid and tetanus toxoid.

4. Cellular fractions- Hepatitis B meningococcal - Vaccines prepared from extracted cellular fractions. Example- meningococcal vaccine from the polysaccharide antigen of the cell wall, the pneumococcal vaccine.

5. Subunit vaccine: This is prepared from a component of the virus. For example, influenza vaccine.

6. Recombinant vaccines: These are genetically engineered recombinant DNA vaccines, i.e. the sub-unit of the virus (antigen) is inserted into the genome of another avirulent virus and vaccine is prepared. For example, hepatitis B vaccine.

7. Combinations- If more than one kind of immunizing agents is included in the vaccine, it is called a mixed or combined vaccine. Example- DPT, DP, DT, MMR etc.

8. Tissue culture vaccines: These are prepared by culturing the seed viruses in special cells such as chick-embryo cells, vero-cells of kidney of monkeys, human embryonic lung fibroblasts, etc. They are highly safe, highly antigenic, highly effective, highly stable, highly potent, highly protective and highly purified. They are costly and are given in multiple doses. They are least reactogenic. For example, PCECV (Purified chick embryo cell vaccine), PVRV (Purified vero-cell rabies vaccine) HDCV (Human diploid cell vaccine) all used against rabies.

Polyvalent vaccines: Vaccine containing more than one strain of the same species. For example, OPV (Trivalent vaccine); influenza vaccine.

Adjuvant vaccines: Adjuvants like aluminium phosphate are used to enhance the antigenic property. But they are painful and often result in fever. For example, purified toxoid adsorbed on aluminium phosphate tetanus toxoid, i.e. PTAP tetanus toxoid.

Freeze dried vaccines: These are the vaccines, which are frozen and dried. Therefore, they are in the form of powder. Hence they are always supplied along with the diluents. Such vaccines are highly stable and retain the potency for a long time than liquid vaccines.

Immunoglobulin's

The human immunoglobulin system is compose of major classes (IgG, IgM, IgA, IgD, IgE) and sub classes with them.

Two types

1. Human Normal immunoglobulin- Normal

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human Ig is an antibody rich fraction, obtained from a pool of at least 1000 donors. It is used to prevent measles in highly susceptible individuals & to provide temporary protection up to 12 weeks.

2. Human Specific immunoglobulin- The specific human Ig should contain at least 5 times the antibody potential of standard preparation per unit volume. The preparations are made from the plasma of patients who have recently recovered from an infection or are obtained from individuals who have been immunized against a specific infection. Example- chickenpox, rabies tetanus I/M injection

Antisera or Antittoxins

The term antiserum is applied to materials prepared in animals. Specific immunoglobulin's prepared from plasma of immunized animals (e.g. horses). It is Cheap and less effective. Immunity lasts for 2-3 weeks

Examples - ATS, ADS, ERIg (equine rabies immunization), Anti-Snake Venum and Anti-Gas-Gangrene Serum etc.

The Cold Chain

Cold chain - the cold chain is a system of storage & transport of vaccine at low temp from the manufacturer to the actual vaccination site

Cold chain equipment

1. Walk in cold room -they are located at regional level to store vaccine up to 3 months & serve 4-5 districts.
2. Deep freezer (300ltr) or ice lined refrigerators(300/240ltr)- supplied to all districts & WIC location to store vaccines. Deep freezers are used for making ice packs & to store OPV & measles.
3. Small deep freezer & ILR (140ltr)- one set is proved to PHC, urban family planning center.
4. Cold boxes- supplied to all peripheral centers used for transportation of vaccines
5. Vaccine carrier - carrier are used to carry small quantity of vaccines (16-20 vials)
6. Day carriers- are used to carry small quantities of vaccine to a nearby session.
7. Ice packs- contain water & no salt should be added to it.

The risk of cold chain failure is greatest at sub-center & village level. For this reason, vaccines are not stored at the sub-center level and must be supplied on the day of use.

Concept of Vyadhikshamatwa

Definition

व्याधिक्षमत्वं नाम व्याधिबल निरोधकत्वम्।
व्याध्युत्पादकप्रतिबंधकत्वमिति ॥
(च.सू. 26)

Immunity is the factor, which prevents the diseases or in certain cases severity of disease. In Ayurveda it is known by different synonyms like Ojas, Tejas, Prana, Bala etc. each emphasizing the importance of immune factor in the body.

Importance of ojus

ओजस्तु तेजो धातुनां। (अ.ह.सू. 11/37)

Ojus is the essence of seven Dhatus according to Shushruta it is one among the seats of Prana i.e. life.

प्राणायतनमुत्तमम्। (सु.सू. 15/26)

Derangement of Ojus produce several diseases & even death.

Nirutki

ओजस्तु तेजो धातुनां शुक्रन्तानां परं स्मृतं।
(अ.ह.सू. 11/37)

Ojus is the essence of seven Dhatu & it is responsible for the strength of an individual.

तत्र रसादीनां शुक्रान्तानां धातूनां यत् परं तेजस्तत खल्वोजस्तदेव बलमित्युच्यते, स्वशास्त्रसिद्धान्तात।
(सु.सू. 15/19)

Ojus is the essence of Rasadi Dhatu that itself is synonym as Bala according to the principles mentioned in classics.

ओजस लक्षण

ओजः सोमात्मकं स्निग्धं शुक्लं शीतं स्थिरं सरम्।
विविक्तं मृदु मृत्स्नं च प्राणायतनमुत्तमम्॥
(सु.सू. 15/21)

click here -} dhruvataare

Ojus is having mild quality like Snigdha, Shukla, Shita, Sthira, Sara, Viviktama, Mrudu, Mrustna & best among the seats of Prana i.e. Pranayatana.

हृदि तिष्ठति यच्छुद्धं रक्तमीषत्सपीतकम्।
ओजः शरीरे सङ्क्षयातं तन्नाशान्ना विनश्यति ॥
(च.सू. 17/74)

Para Ojus which is Astha Bindu in quantity resides in heart. It has reddish yellow color, if it gets destroyed then there is destruction of whole body.

उत्पत्ति–
भ्रमैः फलपुष्पेभ्यो यद्वा सम्भ्रियते मधु।
तद्वदोजः स्वकर्मभ्यो गुणैः सम्भ्रियते नृणाम् ॥
(च.सू. 17/76)

As the bee collect honey from the essence of different flower in the same way ojus is essence of all the Dhatu from the human body.

प्रथमं जायते ह्योजः शरीरेऽस्मिञ्छरीरिणां।
सर्पिर्वर्णं मधुरसं लाजगन्धि प्रजायते ॥
(च.सू. 17/75)

Ojus is formed first during the formation of the body which is characterized by Ghruta, Varna,& smell of Laja & sweet in taste.

ओजस्तु तेजोधातुनां। (अ.हृ.सू. 11/37)

Ojus is considered to be formed as the essence of seven Dhatus.

पर ओजस–
प्राणाश्रयस्यौजसोऽष्टौ बिन्दवो हृद्याश्रयाः एतबिन्दुक परमोजो ज्ञेयम। अष्टबिन्दुकस्य अवयवनाशे अपि मृत्युर्भवतीति ॥
(शा.स. 7)

Para Ojus is the prime Ojus, where Prana the life resides. It is Ashta Bindu, present in heart, even a part of destruction of para Ojus leads to death.

अपर ओजस–
अर्धाञ्जलि परिमाणं तु यदोजस्तदप्रधानः यच्चारिरे वक्ष्यति–तावच्चैव श्लैष्मिकस्योजस्यः प्रमाणम् ॥ (शा.स. 7)

Apara Ojus is half Anjali in quantity. It is less important compared to Para Ojus. Even Shlaishmika Ojus is half Anjali in quantity. They circulate in the vessels connected with heart.

ओजवहस्त्रोतस–
तेन मूलेन महता महामूला मता दश।
ओजोवहाः शरीरेस्मिन विद्याम्यनो समन्तात ॥
(च.सू. 30/8)

Ojus circulates throughout the body through Dasha Dhamani i.e. ten main blood vessels.

Relation between Ojus & Bala

प्राकृतस्तु बलं श्लेष्मा विकृतो मल उच्यते।
स चैवौजः स्मृतः काये स च पाप्मोपदिश्यते ॥
(च.सू. 17/117)

Kapha in the normalcy gives strength to the body & known as Bala. In abnormal state it is like mala i.e. excreta, which should be expelled out of the body. This Bala itself considered as Ojus.

Types of Bala

त्रिविधं बलमिति- सहजं, कालजं, युक्तिकृतं च ॥
(च.सू. 11/36)

1. Sahaja Bala (Natural)
2. Kalaj (Time factor)
3. Yuktikruta (by once intelligence)

सहज बल–
सहजं यच्छरीरसत्त्वयोः प्राकृतं।
प्राकृतमिति जन्मादिप्रवृत्तं प्राकृतधातुबृद्धया ॥
(चक्रपाणिदत्त कृत च.सू. 11/36)

Bala the strength, both mental & physical are present naturally by birth. Certain people are strong by birth due to their excellence of Dhatus this depends on healthiness of Shukra, excellence of time & place.

कालज बल–
कालकृतमृतुविभागजं वयःकृतं च।
ऋतुविभागजम् 'आदावन्ते च दौर्बल्यं' ॥
(चक्रपाणिदत्त कृत च.सू. 11/36)

The strength due to favorable conditions like youth, season etc. the person naturally has less strength in childhood & old age strength increases during Visarga Kala i.e. period of nourishment.

युक्तिकृत बल–
युक्तिकृतं पुनस्तद्यदाहारचेष्टायोगजं। आहारस्य मांस-सर्पिरादेः, चेष्टाया उचितविश्रामव्यायामादेर्योग आहारचेष्टायोगः; अन्ये तु योगशब्देन [illegible]
(चक्रपाणिदत्त कृत च.सू. 11/36)

click here - dhanvantari

Strength acquired by the intake of diet such as flesh, ghee etc. which enhance strength, correct exercise, rest & Rasayana & strength enhancing drugs.

बल वृद्धिकर भावा–

बलवत देश–सैन्दवाः बलवन्ताः पुरुषाः ।

बलवत काल–हेमन्तु शिशिरे काले जातः

बीज, आर्तव, गर्भाशय–प्रशस्त निर्दोष

आहार संपत–सात्म्य संपत सात्म्य आहार, सात्म्य विहार

स्वभावसंसिद्धि–बलजनक कर्म सं सिद्धि व्यायाम संहर्ष,

शरिर वृद्धिकर भाव–

शरिर वृद्धिकरास्त्विमे भावा भवन्ति । तद्यता कालयोगः स्वभावसंसिद्धिः आहार सौष्ठवम अविघातश्च ॥ (च.शा. 6/12)

कालयोग– youthfulness

स्वभावसंसिद्धि– unknown factor (genetic factor) certain unseen factors favours the growth of the body naturally.

आहार सौष्ठवम– good nutritious, energy giving & Rasayanakari food.

अविघात– avoiding factors causing injury like excessive exercise, excessive sexual indulgence, mental trauma etc.

बलाधिष्ठान्मारोग्यं ।

Health is dependent on Bala.

Functions of Ojus

Ojus is very useful to maintain the condition of the good health. It not only nourishes all the body constituents but also nourishes the mind. It controls or regulates all the physiological activities and immunity power of the body. In Ayurveda it is believed that life cannot exist without Oja in the body. Some of the functions are as follows

- Balen (strength bestows)
- Sthira Upachita Mamsata (stability and growth of muscles)
- Sarva Cheshta Swapratighatah(ability to per formal activities without any hindrance)
- Swara Varna Prasado(clarity of voice and brightness of color or complexion)
- Karana Nama Aatma Karya Pratipatti (ability of external and internal sense organs to perform their own functions.)

Abnormalities of Ojus

Oja Visransa, Oja Vyapada and Oja Kshaya are the three stages of Oja Vikriti which may occur in various conditions and diseases ranging from physical and mental fatigue to a cute and chronic mild and severe types of diseases. According to ancient Ayurvedic view these conditions may arises are sult of metabolic abnormalities leading to diminished production of Ojas. They are as follows

1. Ojas Visransa
2. Ojas Vyapada
3. Ojas Kshaya

Symptoms of Ojas Visransa (first stage)

- Sandhi Vishlesh (looseness of joints)
- Gatra Sada (weakness of the body)
- Dosha Chyavanam (provoked Tridoshas move away from their normal seats)
- Kriya Sannirodha (inability to perform normal functions)
- Shrama (lethargy in organs).
- Aprachuryam Kriyanam (It also results in the impairment of Kayika (physical), Vachika (vocal)and Mansika (mental) functions of the body.

Symptoms of Ojas Vyapad (second stage)

- Stabha Gurugatrata (Stiffness and feeling heaviness in the body)
- Vata Shopha-(swelling caused by Vata Dosha impairment)
- Varna Bheda (change in complexion or discoloration)
- Glani (exhaustion)
- Tandra (drowsiness or stupor)
- Nidra (sleep)

Symptoms of Ojas Kshaya (third stage)

- Murchha (unconsciousness or fainting)
- Mansakshaya (decrease of muscles)
- Moha (mental disturbance specially in judgment)

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- Agyan (loss of sense)
- Pralap (delirium)
- Mrityu (death)

According to Charak Samhita

- Bibheti (person is constantly suffer from fear complex)
- Durbaloabhikshanam (physical and mental debility)
- Worries always without apparent reason
- Vyathita Indriya (feels discomfort in the sense organs)
- Duschhaya (developed impaired or loss of complexion of body)
- Durmana (feeble mental stamina)
- Ruksha (dryness or roughness)
- Shama (skin becomes black)
- Kashya (Emaciation of the body).

Factor responsible for reduction of Ojas- Various causes which are responsible for the decreases of Ojas have been mentioned in Ayurveda. They are as follows :

- Ativyayama (excessive physical exercise)
- Anashana (fasting for long period)
- Chinta (constant worry)
- Consumption off odd switch are dry(moisture less)in nature
- Pramitashana (consuming very less quantity of food)
- Vata-atapaseven (excessive exposure to heavy blows of wind and sun heat)
- Bhaya (fear)
- Shoka (grief and sorrow)
- Rukshapaan (drinking strong wines)
- Prajagar (keeping awake eat nights)
- Excessive limitation of Kapha, Shonita (blood), Shukra (semen) and mala (urine and faces).
- Kala (due to old age)
- Abhighata (mental and physical trauma or injury to Marma (vital parts)
- Ativyavaya (excessive sex)

Specific defences- Specific defences come into play, once microorganisms have breached local defence mechanisms. By virtue of these defences, the host is able to recognize, destroy and eliminates antigenic material e.g. bacteria, viruses, proteins etc. foreign to his own.

1. Active immunity
   a) Humoral immunity
   b) Cellular immunity
   c) Combination of the above
2. Passive immunity
   a) Normal human Ig
   b) Specific human Ig
   c) Animal antitoxins or antisera.

1. Active immunity- It is the immunity which an individual develops as a result of infection or by specific immunization and is usually associated with presence of antibodies or cells having a specific action on the microorganism concerned with a particular infectious disease or on its toxin. The active immunity depends upon the humoral and cellular responses of the host. Active immunity may be acquired in 3 ways-

a) Following clinical infection e.g. chickenpox, rubella and measles.
b) Following subclinical or in apparent e.g. polio and diphtheria.
c) Following immunization with an antigen which may be a killed vaccine, a live attenuated vaccine or toxoid.

The immune response-

Primary Response-

First Administration of Antigen

I) 2-3 Days Igm Antibody Rises Slowly

II) In Few Days Igg Appears Reaction Peak By 7-10 Days.

3-10 Days Of Latent Period Is Present Before Antibody Appears In The Blood.

Secondary Response- (booster)

Antigen—IgM——Brief production IgG

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antibody——Larger & prolonged production

Humoral Immunity- The B cells (bone marrow derived lymphocytes) Proliferate& manufacture specific antibodies, after presentation by macrophages & produce humoral immunity. Antibodies are present in immunoglobulin fractions of serum. IgG, IgM, IgA, Igd & IgE are 5 main classes. These circulate in the body & neutralize the microbes.

Cellular immunity- Even though humoral immunity work effectively, cellular immunity is essential in cases of some pathogens like M. laprae, M. tuberculosis S. typhoid. Which escape bactericidal action of leukocyte. The macrophages are stimulated bylymphocytes secreted by T-lymphocytes.

Combination of the both- In addition to the B & T lymphoid cells, the co-operate with macrophages & human K (killed) cells. Which constitute complex events of immunity. e.g. Helper T cells are essential for the proper production of antibodyto most antigens.

Suppresser T cells inhibits immunoglobulin synthesis cytotoxic cells recognize membrane viral antigens, through specific antibody natural killer cell act against non specific virus infected target cells.

Advantages of active immunity-

1. The duration of protection is usually long lasting
2. Excluding some exceptions sever reactions are rare.
3. The protective efficacy of active immunization is more than passive immunization. It is most 100% in some cases
4. Active immunization is cheaper than passive immunization.

Passive immunization-When the antibodies produced in one body (human or animal) are transferred to another, to induce protection against diseases is known as passive immunity.

1. Antibody containing preparation like Immunoglobulin or antiserum is given.
2. Antibodies passing across the placenta e.g. Human milk containing protective antibodies IgA transferred to body.
3. Passive cellular immunity induced by lymphocytea transfer is still under experiment.

Advantages- immunity gets established quickly.

Passive immunization is useful for individual who cannot form antibodies , or for normal host who takes time to develop antibodies following active immunization.

Disadvantages-

1. Immunity produced is established temporary & lasts for few days to mouths.
2. It is costlier than active immunization.

Both active & passive immunization can be consider under Yuktikruta Bala .

Herd immunity-The resistance of a community or group of people to a particular to the spread of disease in the human herd, if the disease is herd immunity. It acts an immunological barrier to the spread of disease in human herd. If the herd immunity is the high the occurrence of an epidemic is unlikely. It is achieved in case of diphtheria & poliomyelitis.

Investigation of an Epidemic

The occurrence of an epidemic always signals some significant shift in the existing balance between the agent host and environment. It calls for a prompt and thorough investigation of the cases to uncover the factor(s) responsible and to guide in advocating control measures to prevent further spread. Emergencies caused by epidemics remain one of the most important challenges to national health administrations. Epidemiology has an important role to play in the investigation of epidemics.

Objectives of an epidemic investigation

1. To define the magnitude of the epidemic outbreak or involvement in terms of time, place and person.
2. To determine the particular conditions and

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factors responsible for the occurrence of the epidemic.

3. To identify the cause, source(s) of infection, and modes of transmission to determine measures necessary to control the epidemic.
4. To make recommendations to prevent recurrence.

Steps of an epidemic investigation

1. **Confirmation of the epidemic/ Verification of diagnosis-** This is important since there may occasionally be misleading reports. Therefore, it is essential to validate the existence of an epidemic by observing a sizable population that is affected at the same time with identical signs and symptoms, as well as by comparing the disease frequencies throughout the same time period in prior years. Often, a comparison like this is not essential, like in the case of epidemics with common causes like acute gastroenteritis and food poisoning. The names of the investigating officers, the name of the village, the primary health centre, the district, the total population of the area, the availability of the types of health services, the date of the visit, and the baseline epidemiological data are also collected.
2. **Confirmation of the existence of an epidemic/ Confirmation of the diagnosis-** This is done from the history and clinical examination of a sample of cases. The necessary material is sent for laboratory investigations. However, time is not wasted by waiting for the investigation report to come.
3. **Defining the population at-risk**

a. **Obtaining a map of the area-** A current map of the area, including natural landmarks and roads, may be necessary for investigation. In isolated areas, the area may be divided into segments using natural landmarks as boundaries, with dwelling units designated by numbers within each section.

b. **Counting the population-** The denominator may be related to the entire population or sub-groups of a population. It may also be related to total events.

4. **Rapid search for all cases and their characteristics**

a. **Medical survey-** Concurrently, a medical survey should be carried out in the defined area to identify all cases including those who have not sought medical care, and those possibly exposed to risk.

b. **Epidemiological case sheet-** The epidemiologist should be armed with an "epidemiological case sheet" for collecting data from cases and from persons apparently exposed but unaffected. The epidemiological case sheet or 'case interview form' should be carefully designed (based on the findings of a rapid preliminary inquiry) to collect relevant information.

c. **Searching for more cases-** The patient may be asked if he knew of other cases in the home, family, neighbourhood, school, work place having an onset within the incubation of the index case.

5. **Data analysis-** The data collected should be analyzed on ongoing basis, using the classical epidemiological parameters - time, place and person.
6. **Formulation of hypotheses-** On the basis of time, place and person distribution or the Agent-Host-Environment model, formulate hypotheses to explain the epidemic in terms of possible source, causative agent, possible modes of spread, and the environmental factors which enabled it to occur.
7. **Testing of hypotheses-** The hypothesis can be tested by doing 'case-control' study to calculate exposure rate.
8. **Evaluation of ecological factors-** An investigation of the circumstances involved should be carried out to undertake appropriate measures to prevent further transmission of the disease.
9. **Further investigation of population at risk-** A study of the population at risk or a sample of it may be needed to obtain additional information. This may involve medical

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examination, screening tests, examination of suspected food; faeces or blood samples, biochemical studies, assessment of immunity status, etc.

10. **Writing the report-** This should be systematic, correct, comprehensive, complete and convincing including the recommendations for the prevention of recurrence of the epidemic.

Prevention and Control of an Epidemic

Every disease has certain weak points susceptible to attack. Identify these weak points and break the weakest links in the chain of transmission. This requires sound epidemiological knowledge of the disease Magnitude Distribution in time, Place and person Multifactorial causation Sources of infection Dynamics of transmission.

Three main measures are adopted for Prevention of infectious diseases

1. Controlling the reservoir /Elimination of reservoir
2. Interruption of transmission/ Breaking the channel of transmission
3. Immunizing the susceptible host/ Protect of susceptible

1. Controlling the reservoir /Elimination of reservoir

The general measures of reservoir control comprise- Early diagnosis, Notification, Epidemiological investigations, Isolation, treatment, Quarantine, surveillance and Disinfection.

1. Early diagnosis- Rapid identification of disease plays crucial role in the control of a communicable disease. Early diagnosis is needed for to treatment the patients for epidemiological investigations, e.g., to trace the source of infection from the known or index case to the unknown. To study the time, place and person distribution FOR the institution of prevention and control measures.

2. Notification- Once an infectious disease has been detected (or even suspected), it should be notified to the local health authority. Begin control measures, including the provision of medical care to patients. Diseases which are considered to be serious menaces to public health are included in the list of notifiable diseases. International Health regulations Cholera Plague and Yellow fever Diseases under surveillance by WHO Louse-borne typhus fever Relapsing fever Paralytic polio Malaria Viral influenza -A, SARS diseases, Small pox etc.

3. Epidemiological Investigations- The outbreak investigation helps to identify the source of infection the factors influencing its spread in the community. These may include geographical situation, climatic condition, social, cultural and behavioural patterns, THE character of the agent, reservoir, the vectors and vehicles, and the susceptible host populations.

4. Isolation- Separation for the period of communicability of infected persons or animals from others in such places and under such conditions, as to prevent or limit the direct or indirect transmission of the infectious agent from infected to susceptible.

Isolation has a distinctive value in the control of some infectious diseases. e.g., diphtheria, cholera, streptococcal respiratory disease, pneumonic plague, etc. If the diseases have large component of subclinical infection and carrier state even the most rigid isolation will not prevent the spread of the disease. e.g., polio, hepatitis A, and typhoid fever. Duration of isolation the duration of isolation is determined by the duration of communicability of the disease and the effect of chemotherapy on infectivity. Example- Chickenpox Until all lesions crusted; usually about 6 days after onset of rash. Measles From the onset of catarrhal stage through 3rd day of rash. Cholera and Diphtheria, 3 days after tetracycline started, until 48 hours of antibiotics.

Types of Isolation-

1. Standard isolation
2. Strict isolation
3. Protective isolation
4. High security isolation

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5. Hospital isolation
6. home isolation
7. Ring immunization encircling of the persons.

5. Treatment- Many communicable diseases have been tamed by effective drugs. The objective of treatment is to kill the infectious agent when it is still in the reservoir before it is disseminated. Reduce the communicability of disease Cut short the duration of illness and Prevent development of secondary cases Limit the disability Individual treatment or mass treatment.

6. Quarantine- It is defined as 'the limitation of the freedom of the movement of those healthy persons, who are suspected to have been exposed to a communicable disease for a period equal to the longest incubation period of the disease, in the international airport or seaport, in such a manner as to prevent the International spread of the diseases.'

Absolute quarantine- well persons or domestic animals exposed to communicable disease for a period of time not longer than the longest usual incubation period of the disease.

Modified quarantine-a selective or partial limitation of freedom of movement, such as exclusion of children from school. Segregation the separation for special consideration, control of observation of some part of a group of persons (or domestic animals) from the others to facilitate control of a communicable disease. Example - removal of susceptible children to homes of immune persons.

2. Interruption of transmission/ Breaking the channel of transmission

This may mean changing some components of man's environment to prevent the infective agent from a patient or carrier from entering the body of susceptible person. Example -water can be a medium for the transmission of many diseases such as typhoid, dysentery, hepatitis-A, cholera and gastroenteritis. Simple chlorination to complex treatment of water will eliminate these diseases.

Clean practices such as hand washing, adequate cooking, prompt refrigeration of prepared foods and withdrawal of contaminated foods will prevent most food borne illnesses. Vector control also includes destruction of stray dogs, control of cattle, pets and other animals to minimize spread of infection among them, and from them to man. Personal hygiene and proper handling of secretions and excretions.

3. Immunizing the susceptible host/ Protect of susceptible

This third link in the chain of transmission. They may be protected by one or more following point.

1. **Active Immunization**-Strengthening of the host defences is one of the ways to control the spread of infection. Active immunization is one of the most powerful and cost-effective weapons of modern medicine. There are some infectious diseases whose control is solely based on active immunization, e.g., polio, tetanus, diphtheria and measles. Vaccination against these diseases is given as a routine during infancy and early childhood with periodic boosters to maintain adequate levels of immunity.

2. **Passive Immunization**-Three types of preparations are available for passive immunity - Normal human immunoglobulin, Specific (hyperimmune)human immunoglobulin Antisera or anti-toxins. Passive immunity will provide immunity for 6 months.

3. Combined Passive and Active immun-ization

4. **Chemoprophylaxis**- Chemoprophylaxis implies the protection from, or prevention of disease. Causal prophylaxis implies the complete prevention of infection by the early elimination of the invading or migrating causal agent. For example, there is no causal prophylaxis available against malaria. Clinical prophylaxis implies the prevention of clinical symptoms; it does not necessarily mean elimination of infection.

5. Non-Specific Measures-Non-specific factors have played a dominant role in the decline of Diseases example tuberculosis, cholera, leprosy and child mortality The industrialized world, declined these Diseases long before the introduction

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of specific control measures. Improvements in the quality of life e.g., better housing, water supply, sanitation, nutrition, education. Legislative measures to formulate integrated programme and effective implementation. Community involvement in disease surveillance, Disease control and other public health activities. Scarcity of funds, lack of an effective health infrastructure, public health laboratory facilities, equipment, supplies, trained personnel (e.g., epidemiologists). Public awareness needed for the investigation and control of communicable diseases.

Sankramaka Roga as per Ayurveda

Sankramakarogas (Contagious Diseases)

प्रसङ्गाद्गात्रसंस्पर्शान्निश्वासात् सहभोजना।
सहशय्यासनाच्चापि वस्त्रमाल्यानुलेपनात्॥
कुष्ठं ज्वरश्च शोषश्च नेत्राभिष्यन्द एव च।
औपसर्गिकरोगाश्च सङ्क्रामन्ति नरान्नरम॥
(सु.नि. 5/33-34)

Certain group of diseases is spread from one person to another by direct or indirect contact and is termed as Sankramika Rogas. Sushruta has clearly mentioned that diseases (Aupasargikarogas) like Kushta (leprosy), Jwara (fever), Shosha (tuberculosis), Netrabhishyanda (conjunctivitis) etc. infectious diseases spread from one person to the other. The exposure or contact can be a simple association, touch, inhalation of other's expired air, eating together in one plate, sleeping and lying together and wearing other's clothes etc things. Even sexual contact with an infected woman is said to give rise so many sexual transmitted diseases. Vagbhata says all the diseases are transmitted like this only but skin diseases & diseases of the eyes have more communicability. It is also stated that Aganturoga can vitiation of Dosha which may leads to manifestation of a new Nijaroga and vice versa.

Even though the ancient authors not clearly described about the various modes infectious diseases transmission, but we can understand from the above statement that the some infectious diseases will spread by direct skin contact or use of used articles of the patient (Kushta, Netrabhishyanda etc.), some by direct droplet infection (Sosha, Yakshma etc.), some by with oral ingestion (Jwara etc.), some by sexual intercourse (Upadamsa etc.).

Syllabus- Epidemiological determinants, brief pathology, transmission, incubation period, clinical features, diagnosis and preventive measures of Droplet Infections such as Chicken Pox, Measles, Rubella, Diphtheria, Pertussis, Mumps, Tuberculosis, SARS, Influenza, Pneumonia, Covid-19 and Leprosy.

Learning objective- Explain Epidemiological determinants, brief pathology, transmission, incubation period, clinical features, diagnosis and preventive measures of Droplet Infections such as Chicken Pox, Measles, Rubella, Diphtheria, Pertussis, Mumps, Tuberculosis, SARS, Influenza, Pneumonia, Covid-19 and Leprosy.

Chicken Pox (Varicella-Zoster Virus Infections)

Chicken pox is caused by a virus called varicella zoster. People who get the virus often develop a rash of spots that looks like blisters all over their bodies. The blisters are small and sit on an area of red skin that can be anywhere from the size of a pencil, eraser to the size of a dime.

Incubation Period- 10 -21 days

Source of infection- Usually a case of chickenpox.

Infectivity period- Usually starts a day before appearance of rash and lasts for about seven days.

Distribution- is worldwide.

Host Factors

Age- Children under 10 years of age.

Environmental Factors- During the first six month of the year.

Seasonal incidence- more common during spring.

Mode of Transmission- Person to person by droplet infection.

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Clinical Features

Pre-eruptive stage- Onset is sudden with mild or moderate fever, pain in back, shivering and malaise. This stage is very brief, lasting about 24 hours.

Eruptive stage- rash is often the first sign. It comes on the day fever starts, rashes are symmetrical. It first appears on the trunk where it is abundant, and them come on the face, arms and legs.

The best-known symptom of chickenpox is the itchy, red rash that breaks out on the face, scalp, chest, back, and sometimes arms and legs. The rash usually appears about 2 weeks after exposure to the virus and begins as superficial spots.

The spots quickly fill with a clear fluid, rupture, and turn crusty. The scabs then fall off in a week or two. The rash continues to break out for the first 1 to 5 days, so spots at various stages of development may be present at the same time. Chickenpox seldom lasts for more than 2 weeks, from the appearance of the first rash to the disappearance of the last one. A secondary infection of the ruptured rash by bacteria may cause high fever and skin scarring.

Pathology and Pathogenesis- Having entered the body through the respiratory route, the viruses circulate in the blood, later affect the epidermis part of the skin, because of its dermatotropic property, resulting in balooning degeneration of the cells and outpouring of intercellular fluid, forming a vesicle. Very soon the polymorphs migrate from the clear fluid of the vesicle and fluid becomes turbid, the lesions are called pustules, which dry up rapidly resulting in scabs. The scabs separate within 8 to 10 days without leaving pock marks.

Treatment- Chickenpox is a virus, so doctors will not prescribe an antibiotic. Over time, the body's immune system will clear out the virus. Usually, those infected are asked to stay home, rest, cut their nails, and depending on the severity of the rash, wear gloves to prevent further infections. Anti-itch creams and staying in cooler temperatures will help with the rash.

Prevention- Varicella zoster immunoglobulin (VZIG) given within 72 hours of exposure has been recommended for prevention of chickenpox in exposed susceptible individuals particularly in immune suppressed persons.

Control- The usual control measures are notifications, isolation of cases for about 6 days after onset of rash and disinfection of articles soiled by nose and throat discharges.

Difference between smallpox and chicken pox

Small pox	Chickenpox
1. Incubation - about 12 days	About 15 days
2. Prodormal symptoms- severe	Usually mild
3. Distribution of rash- a. Centrifugal b. Palm and sole frequently involved c. Axilla usually free d. Rash predominant and bony prominences.	a. Centripetal b. Seldom affected c. Axilla affected d. Rash mostly on flexor surfaces.
4. Characteristics of The Rash- a. Deep-Seated b. Vesicles multilocular and umbilicated c. Only one stage of rash may seen at one time	a. Superficial b. Unilocular; dew-drop like appearance c. Rash pleomorphic d. An area of inflammation is seen around the vesicles.
5. Evolution of rash- a. Evolution of rash is slow, deliberation and majestic, passing through definite stages of macule, papule, vesicle and pustule. b. Scabs begin to form 10-14 days after the rash appears	a. Evolution of rash very rapid b. Scabs begin to form 4-7 days after the rash appears.
6. Fever - Fever subsides with the appearance of rash, but may rise again in the pustular stage	Temperature rises with each freah crop of rash.

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Measles (Rubeola)

Measles also known as Rubeola and Red spot. Measles is an acute highly contagious viral disease caused by measles virus. It is characterized by fever, URT catarrhal inflammation, koplik's spots and maculopapular.

Agent Factor- RNA virus (Paramyxo virus family, genus Morbillivirus)

Source of infection-cases of measles, but not carriers. No animal reservoir

Infective material- Nasal secretion, Respiratory tract and Throat

Communicability- Highly infectious during prodromal period and at the time of eruption. Secondary attack rate- > 80%

Host Factors

Age- 6 months to 3 years even up to 10 years

Incidence equal in both sexes

Immunity -lifelong immunity

Nutrition-Malnourished children are susceptible.

Environmental Factor-Winter season, over crowding

Mode of Transmission - Droplet infection, 4 days before and 4 days after rash

Incubation period- 10 days

Clinical Features

There are three stages :

1. Prodromal stage: Begins 10 days after infection and lasts until day 14. It is characterized by fever, coryza with sneezing and nasal discharge, cough, redness of the eyes, lacrimation and often photophobia. There may be vomiting or diarrhoea. A day or two before the appearance of the rash koplik's spots appear on the buccal mucosa opposite the first and second upper molars. The koplik's spot are small bluish-white spots on a red base smaller than the head of a pin and they show the pathogenicity in measles.

2. Eruptive phase: This phase is characterized by a typical, dusky-red, macular or macula popular rash which begins behind the ears and spreads rapidly in a few hours over the face and neck and extends down the body taking 2 to 3 days to progress to the lower extremities.

3. Post-measles stage: The child will have lost weight and will remain weak for a number of days. There may be failure to recover and a gradual deterioration into chronic illness due to increase susceptibility to other bacterial and viral infections, nutritional and metabolic effects and the tissue destructive effects of the virus. There may be growth retardation and diarrhea, cancrum oris, pyogenic infections, candidiasis, reactivation of pulmonary tuberculosis etc.

Pathogenesis- Having entered the body through the respiratory tract by droplet infection, the viruses quickly pass to the nearest lymph nodes, multiply there and then leak into the bloodstream in small amounts to reach reticuloendothelial cells in liver, spleen and bone-marrow, where they multiply, destroy those cells and flow again into the bloodstream in sufficient numbers as to affect many tissues in the body, mainly respiratory mucosa (i.e. nose, throat and bronchial tree), alimentary mucosa, conjunctiva and skin. Therefore, the symptoms are mainly due to inflammatory reactions in these areas.

Complications: Measles - associated diarrhea, pneumonia and other respiratory complications and otitis media. The serious neurological complications like febrile convulsions, encephalitis and sub-acute sclerosing and pan-encephalitis.

Treatment- There is no specific antiviral therapy; treatment is entirely supportive. Antipyretics (acetaminophen or ibuprofen) for fever, bed rest maintenance of an adequate fluid intake are indicated.

Humidification may alleviate symptoms of laryngitis or an excessively irritating cough; it is best to keep the room comfortably warm rather than cool. Patients with photophobia should be protected from exposure to strong light. Bacterial complications of otitis media and bronchopneumonia require appropriate antimicrobial therapy.

Prevention

Measles Vaccination - It is now included in the

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universal immunization programme. This UIP administered a single dose of 0.5 ml subcutaneous injection at the age of 9-12 months without any boostered dose. Only live attenuated vaccines are recommended for use. Immunity develops 1-12 days after vaccination and standing probably for life long, one dose of vaccination provides 95% protection.

Control measures

Isolation for 7 days after onset of rash.

Immunization of contacts within 2 days of exposure.

Prompt immunization at the beginning of an epidemic is essential to limit the spread.

Rubella (German measles)

Rubella (German measles) is a disease caused by the rubella virus. Rubella is usually a mild illness. Most people who have had rubella or the vaccine are protected against the virus for the rest of their lives. Because of routine vaccination against rubella since 1970, rubella is now rarely reported.

History of Rubella-The Teratogenic property of the infection was documented by an Australian opthalmologist Greeg in 1941.

The rubella virus is transmitted by airborne droplets when infected people sneeze or cough. Humans are the only known host.

Agent Factors

Causative agent : Rubella virus RNA virus of the Togavirus Family.

Source of infection : Subclinical and Clinical, Congenital from infected pregnant women to fetus. There is no known carrier state.

Period of communicability : It probably extends from a week before symptoms to about a week after rash appears. Infectivity is greatest when the rash is erupting.

Host Factors

Age- Disease of childhood 3-10 yrs age group. Following widespread immunization campaigns persons older than 15 yrs account for 70% cases in developed countries.

Immunity-One attack results in lifelong immunity. Infants of immune mothers are protected for 4-6 months. In India, about 40% of child bearing age group women are susceptible to rubella.

Environmental Factors - Disease usually occurs in seasonal pattern, during the late winter & spring. Epidemics every 4-9 years.

Mode of transmission - Person to person- via respiratory route: Droplet from nose and throat Droplet nuclei (aerosols) Maintain in human population by chain transmission.

Acquired during pregnancy- vertical transmission:-Virus can enter via the Placenta and infect the foetus in uterus (Congenital Rubella Syndrome).

Incubation period- Between 14-21 days

Clinical Features

a. Prodromal stage: Usually the symptoms are mild, characterised by mild fever, coryza, sore-throat, dry cough lasting for a day or two. This stage indicates the onset of viremia.

b. Lymphadenopathy: In most of the cases, the post auricular and posterior group of cervical lymph nodes rashes and persist for about 10-15 days after the disappearance of the rashes. They are not tender among children but often tender among adults. A faint suffusion of conjunctivitis may occur among adults.

c. Exanthematous stage: Fine maculo-popular rashes appear first on the face within 24 hours of the onset of prodromal symptoms. They are small, pale, pinkish and discrete (not confluent as in measles). They spread rapidly to trunk on second day and extremities on 3rd day. By the time they appear on extremities, they will disappear over the face, thus lasting for 3 days only. So it is also called as 3-day measles. Rash is an inconsistent feature. It does not appear in about 25 percent of cases and sub-clinical cases. If the rash is atypical, cervical lymphadenopathy is often a helpful diagnostic sign.

Complications- Arthritis and arthralgia is a common complication particularly among women.

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Encephalitis is very rare. Thrombocytopenic purpura may occur. Common dreadful complication is congenital malformation of the fetus in a pregnant mother.

Prevention of Rubella- Immunization with the MMR vaccine is the most effective way to protect against rubella. It is a combined vaccine that protects children against all three conditions - measles, mumps and rubella. It contains the safest and most effective form of each vaccine. This is usually given to children between 12 and 15 months followed by a booster injection before entering school (usually between three to five years of age).

Diphtheria

Diphtheria is an acute highly infectious disease of preschool children, caused by the bacteriae Corynbacterium diphtheriae. Clinically it is characterized by quiet beginning, gradual rise of temperature, signs and symptoms of toxemia and formation of a greyish-yellow membrane at the site of implantation in the throat, over the tonsils, pharynx or larynx with associated lymphadenopathy. Case fatality rate is about 10 percent.

Incubation period: 2-6 days

Agents Factors

Causative organism- Coryynebacterium Diphtheria gram positive organism

Source of infection- may be case and carrier.

Infective material- Nasophayngeal secretions, discharge from skin lesion, fomites and infected dust.

Period of infectivity- unless treated, the period of infectivity may vary from 14-28 days (2-4 weeks).

Host Factors

Age- children aged 1 to 5 years.

Sex- both sexes are affected.

Immunity - infants born of immune mother are relatively immune during the first few week or months of life.

Environmental Factor- Cases of diphtheria occur in all seasons.

Mode of transmission- the disease is spread mainly by droplet infection.

1. Portal entry-
2. Respiratory route - commonly the portal of entry is respiratory tract.
3. Non-respiratory routes- the portal of entry sometimes may be the skin where cuts, wounds and ulcers not properly attended to may get infected with diphtheria bacilli.

Signs and Symptoms- usually begin two to five days after a person becomes infected and may include:

- Respiratory tract forms of diphtheria consist of pharyngo tonsillar, laryngeo tracheal, nasal and combinations.
- Patients with pharyngo tonsillar diphtheria usually have a some throat, difficult in swallowing and low grade fever.
- Laryngeal diphtheria causes obstructive croup stridor and eventually asphyxia

Treatment- Specific treatment with antibiotics and an antidote to the toxin is available.

Diphtheria antitoxin should be given without delay IM or IV in doses ranging from 20,000 to 1,00,000 units or more, depending upon severity.

Active immunization in childhood with diphtheria toxoid yields antitoxin levels adequate until adulthood. Usually combined with tetanus toxoid and/or pertussis vaccine (DPT vaccine).

Preventive Measures

DPT vaccine should stored at 4-8 degree c. Potency of vaccine lasts upto 18 month if properly stored the vaccine should be frozen.

Dose- DPT vaccine is 0.5 ml.

Mode of administration - intramuscular only.

All children must receive an initial course of immunizations and boosters (5 injections at 2 months, 4 months, 6 months, 15-18 months, and at 4-6 years).

Regular booster (every 10 years) with Td (tetanus and diphtheria) toxoids are particularly important for adults who travel to developing countries.

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Control Measures

1. Cases and carriers

a) Early detection: Carriers can be defected only by culture method. Swabs can be taken from both the nose and throat and examined by culture methods for diphtheria bacilli.

b) Isolation: Suspected cases and carriers should be promptly isolated, preferably in a hospital for at least 14 days.

c) Treatment: For Cases when diphtheria is suspected diphtheria antitoxin should be given without delay. Iron or IV in doses ranging from 20,000 to 1,00,000 units or more depending upon the severity of the case.

For Carriers: The carriers should be treated with 10 days course of oral erythromycin which is the most effective drugs for the treatment carriers.

2. Contacts: Contacts merit special attention. They should be throat swabbed and their immunity status determined. The bacteriological surveillance of close contact should be continued for several weeks.

3. Community: The only effective control is by active immunization with diphtheria toxoid. All children and are not previously immunized should be given a dose of 500 to 1000 IV diphtheria antitoxin.

Complication

1. Neurological (Encephalitis encephalopathy)
2. Prolonged convulsions
3. Infantile spasms.

Pertussis (Whooping Cough)

Pertussis, also known as whooping cough, is a highly contagious respiratory disease. It is caused by the bacterium Bordetella Pertussis. Pertussis is known for uncontrollable, violent coughing which often makes it hard to breathe.

Agents Factor

Causative organism - Bacterium Bordetella Pertussis.

Source of infection- B. Pertussis infects only man

Host Factor

Age- highest incidence is found below the age of 5 years.

Sex- incidence and fatality are observed to be more among female than male children's.

Immunity -recovery from whooping cough or adequate immunization is followed by immunity.

Environmental Factor- Pertussis occurs throughout the year, but the disease shows a seasonal tread with more cases occurring during winter and spring months, due to overcrowding, socio- economic conditions.

Mode of transmission- Whooping cough is spread mainly by droplet infection and direct contact.

Incubation period - 7-14 days (not more than 3 week)

Infectious period - Most contagious during the catarrhal stage and the first 2 weeks after cough onset

Duration of illness :

Children: 6-10 weeks.

Adolescents: 10 weeks or longer

Spread occurs by direct contact or droplet infections during cough. Infants less than one year of age constitute 50-70% of diagnosed cases.

Period of communicability-The disease occurs 3-12 days after exposure to an infected individual. The coughing stage lasts for approximately six weeks before subsiding. In some countries, this disease is called the 100 days' cough or cough of 100 days because of its length.

Symptoms of Pertussis

The whoopsound occurs with the forceful inspiration after a coughing fit. This sound is uncommon in young infants and adults, but may be more common in children. The entire illness may last as long as 6 weeks. The illness occurs in 3 major stages (the catarrhal, paroxysmal, and convalescent stages). Infants and adults may not

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show the normal progression of stages Children (especially infants) may appear perfectly well in between episodes of coughing.

A complete blood count may show a high lymphocyte count. If the neutrophil count is high and/or fever is present, then other types of infection should be considered. A chest x-ray may be normal or show mild abnormalities. Bacterial culture of respiratory secretions is the best test.

Clinical Manifestations: The incubation period of pertussis has a mean of 7 and a range of 6-20 days. >Classically, divided into:

1. Catarrhal
2. Paroxysmal, and
3. Convalescent stages.

Catarrhal Stage-The term catarrh is derived from historic Middle English, meaning "to flow". That is, secretions from the nose and mucous membranes flow, causing nasal congestion and runny nose. Nasal congestion, Runny nose, Mild fever, Eye redness and Excess eye watering.

Paroxysmal Stage- Severe series of coughs usually ending with a high-pitched whoop. The whoop starts 1 to 2 weeks after the cold symptoms and lasts 1 to 2 months

Thick, clear, sticky mucous may be coughed up at the end of the coughing spasm Coughing spasms are more frequent at night

Convalescent Stage- Gradual disappearance of symptoms occurring over 2 to 4 weeks, however, coughing spells can last for weeks or months. Cough may become louder and may sound like it is getting worse as the person is getting better. Coughing may flare up again later in a cold or upper respiratory illness. This does not mean that the person has been re-infected with pertussis

Complications- occurs in 5-6 percentage of cases.

The chief complications of pertussis are bronchitis, bronchopneumonia and bronchiectasis.

Secondary infections- otitis media or pneumonia (either secondary to pertussis or other organisms)

Treatment- The newer macrolides (azithromycin and clarithromycin) have good in vitro activity against B Pertussis, and Clarithromycin (500 mg bid) used for 10-14 days and Azithromycin (500 mg/d) used for 5-7 days have been used with good results. Steroids may reduce the number and severity of cough paroxysms, but are generally only recommended for infants with serious disease.

Prevention and Control

1. Notification
2. Isolation
3. Washing hands with soap and warm water.
4. Teaching children to cover mouth and nose if coughing or sneezing and to wash hands after doing so.
5. Not sharing eating utensils and drinking glasses.
6. Minimizing the amount of contact you have with someone you know is infected or if you are infected, minimizing the amount of time you are around others.
7. Immunization

Active immunization in childhood with diphtheria toxoid yields antitoxin levels adequate until adulthood. Usually combined with tetanus toxoid and/or pertussis vaccine (DPT vaccine).

All children must receive an initial course of immunizations and boosters (5 injections at 2 months, 4 months, 6 months, 15-18 months, and at 4-6 years).

Mumps

Mumps is an acute infectious viral disease usually affecting the salivary glands commonly the parotid gland. The name comes from the British word "to mump", that is grimace or grin. The appearance of the patient as a result of parotid gland swelling seems to be in grin.

Agents Factors

Causative organism- Paramyxovirus paratoditis in a RNA virus of the Myxovirus family.

Source of infection - both clinical and subclinical cases.

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Period of communicability - 4-6 days of onset of symptoms

Distribution- is worldwide.

Secondary attack rate - 86%

Incubation periods - 2 to 3 weeks (7-18 days)

Host factors

Age -5-15 years

Sex -girls common

Immunity - life long

Environmental factor - winter and spring season favours

Mode of transmission - droplet infection

Clinical Features

There is sudden onset of fever, associated with headache, body ache, malaise, lasting for 1 or 2 days followed by painful enlargement of one or both parotid glands, associated with ear-ache, difficulty in opening the mouth, and tenderness in the parotid region. Sublingual and sub-mandibular gland may also be affected.

Complications: Occur when other glands are affected. These are orchitis, oophoritis, myocarditis, which are all very rare.

Prevention

Vaccination- Highly attenuated vaccine is now available.

Control- The control of mumps is difficult because the disease is infections before a diagnosis can be made. The long and variable incubation period and the occurrence of subclinical cases make the control of spread difficult. Cases should be isolated till the clinical manifestations subside.

Tuberculosis

Tuberculosis is an ancient disease described in Vedic Medicine as Yakshma. Belief based concept eventually entered reason based Ayurvedic treatises with a redefined name Rajayakshma. In western world it was known as phthisis. TB is caused by Mycobacterium tuberculosis, commonly known as "Koch's Bacillus" or tubercle bacillus or Acid-Fast Bacillus (AFB).

Burden of Disease - India

Yearly 1.8 million persons (5000/day) develop TB out of which 0.8 million are new smear +ve cases and 0.13 million cases of multi drug resistance.

Mortality of 0.32 million cases each year.

Annual risk of being infected with TB is 1.5% and once infected 10% life time risk of developing TB.

2 out of every 5 Indians are infected with TB bacillus and patients with PTB can infect 10-15 persons in a year.

5% of TB patients are HIV +ve.

Direct and indirect cost of TB to India amount to Rs. 13,000 crore per year (US$ 3 billion)

"Tuberculosis is defined as an infectious disease caused by a bacterium; that most commonly affects the lungs." Currently, it kills "three million people" a year and could claim up to 30 million lives if not controlled.

Agent Factors

Mycobacterium tuberculosis which is carried by humans. Mycobacteriumtuberculosiscan present itself in the human body in different forms effecting anywhere from "the intestines, bones, joints, skin, and the genitourinary, lymphatic, and nervous system.

Incubation period- From infection to development of a positive TB skin test reaction (the incubation period) is approximately 2 to 12 weeks. The risk for developing active disease is the highest in the first two years after infection and development of a positive TB skin test reaction.

Source of infection

1. Human source
2. Bovine source

Communicability-Infection as long as not treated communicability reduces by 90% within 48 hr's of treatment.

Host factors

Age- 0-14 age group 2 percent

15-24 years- 20 percent

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Sex- Moreprevalent in male than females.

Nutrition- Malnutrition is widely believed to predispose to tuberculosis.

Immunity- Man has no inherited immunity against tuberculosis.

Mode of transmission

- Droplet infection
- Droplet nuclei

Incubation period- The time from receipt of infection to the development of a positive tuberculosis test ranges from 3- 6 weeks, and thereafter, the development of disease depends upon the closeness of the contact.

Common Symptoms of TB Disease-

1. Cough (2-3 weeks or more)
2. Coughing up blood
3. Chest pains
4. Evening raising Fever
5. Night sweats
6. Feeling weak and tired (general weakness)
7. Losing weight without trying
8. Decreased or no appetite
9. If you have TB outside the lungs, you may have other symptoms

Prevention and Control Measures- The control measures consist of a curative component namely case finding and treatment and a preventive component namely BCG vaccination.

Medical interventions

- Chemotherapy
- Immunoprophylaxis
- Chemoprophylaxis-isoniazid 5mg/kg body wt daily x 6 months
- Treatment of HIV-infected / AIDS cases
- Strategies for prevention of HIV infection as per NACO guidelines
- Silicosis: Screen patients with silicosis once in 6 months and treat for TB when necessary
- For extra pulmonary TB surgery sometimes required

SARS (Severe Acute Respiratory Syndrome)

Severe acute respiratory syndrome (SARS) is a communicable viral disease, caused by a new strain of coronavirus, which differ considerably in genetic structure from previously recognized coronavirus.

The most common symptoms in patients progressing to SARS include fever, malaise, chills, headache, myalgia, dizziness, cough, sore throat and running nose. In some cases there is rapid deterioration with low oxygen saturation and acute respiratory distress requiring ventilator support.

Incubation Period- 2 to 7 days, commonly 3 to 5 days.

Mode of transmission- The primary mode of transmission appears to be through direct or indirect contact of mucous membranes of eyes, nose, or mouth with respiratory droplets or fomites.

Treatment

1. No specific treatment for SARS.
2. Use of antibiotics.
3. Severe cases require intensive support.
4. Although a number of different agents including Ribavirin 400-600md per day, Lopinavir 400 mg. etc.

Prevention

As there is no vaccine against SARS, the preventive measures for SARS control are appropriate detection and protective measures

1. Effective isolation of SARS patients in hospitals.
2. Prompt identification of person with SARS, their movement and contacts.
3. Appropriate protection of medical staff treating these patients.
4. Comprehensive identification and isolation of suspected SARS cases.
5. Exit screening of international travellers.

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Influenza

Influenza is an acute respiratory tract infection caused by influenza virus, of which there are three types- A, B and C. All known pandemics were caused by influenza A strains. The disease is characterized by sudden onset of chills, malaise, fever, muscular pain and cough. At present three types of influenza viruses are circulating in the world: A (H1N1), A (H3N2) and B virus.

Agent Factors

Agent- Influenza viruses are classified within family Orthomyxoviridae.

Reservoir of infection- major reservoir of influenza virus exits in animals, and birds.

Source of infection- Usually a case or subclinical case.

Period of infectivity- Virus is present in the nasopharynx from 1 to 2 days before and 1 to 2 days after onset of symptoms.

Host Factors

Age-all ages

Sex- both sexes

Immunity- Immunity to influenza is subtype specific, antibodies against HA and NA are important in immunity to influenza.

Environmental Factors

Season- Usually occurring in winter months.

Mode of transmission- influenza is spread mainly from person to person by droplet infection or droplet nuclei.

Incubation period- 18-72 hours

Clinical Features

Fever, chills, aches and pains, sore throat, coughing and generalised weakness.

Prevention of Influenza

All attempts to control influenza epidemics have so far met with little success and the prospects of achieving control remain poor.

Good ventilation of public building, the avoidance of crowded places during epidemics, encouraging suffers to cover their faces with a handkerchief when coughing and sneezing.

Influenza vaccine- killed vaccine 0.5 ml for adult and over 3 years. 0.25 fro 6 to 36 month child. 2 dose of vaccine interval 3 to 4 week.

Pneumonia

Pneumonia is an inflammation of the airspaces in the lung most commonly caused by infections. An infection of the lungs, which can be caused by a variety of microorganisms, including viruses, bacteria, and parasites. There are also few non-infectious types of pneumonia that are caused by inhaling or aspirating foreign matter or toxic substances into the drugs.

Symptoms- Fever, Chills, Cough, Unusually rapid breathing, Breathing with grunting or wheezing sounds, Labored breathing, Vomiting, Chest pain, Abdominal pain, Decreased activity.

Pneumonia Diagnosis

1. Physical exam: Your doctor will listen to your lungs with a stethoscope. If you have pneumonia, your lungs may make crackling, bubbling, and rumbling sounds when you inhale. You also may be wheezing, and it may be hard to hear sounds of breathing in some areas of your chest.
2. Chest x-ray (if your doctor suspects pneumonia)
3. CBC blood test to check white blood cell count
4. Arterial blood gases to see if enough oxygen is getting into your blood from the lungs
5. CT (or CAT) scan of the chest to see how the lungs are functioning
6. Sputum tests to look for the organism (that can detected by studying your spit) causing your symptoms
7. Pleural fluid culture if there is fluid in the space surrounding the lungs
8. Pulse oximetry to measure how much oxygen is moving through your bloodstream, done by simply attaching a small clip to your finger for a brief time

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9. Bronchoscopy, a procedure used to look into the lungs' airways, which would be performed if you are hospitalized and antibiotics are not working well

Treatments

1. Antibiotics (bacterial)
2. Antiviral medications
3. Bed rest

Prevention

1. Vaccine
2. Don't share food or drink, or be around sick people
3. Washing your hands frequently and using alcohol rubs to kill germs
4. Quit smoking and avoid abusing alcohol
5. Covering your mouth and nose when sneezing or coughing.
6. Limiting your exposure to sick people and not exposing others when you are sick.

Coronavirus disease (COVID-19)

Coronavirus disease (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus. This new virus and disease were unknown before the outbreak began in Wuhan, China, in December 2019. COVID-19 is now a pandemic affecting many countries globally

Origin of the virus

The source is most likely a virus spillover from an intermediary animal host into human populations. The first known human case had onset of symptoms from 1st December and has not been linked to the suspected market in Wuhan, China.

Cases may have occurred as far back as mid-November or earlier. Environmental samples taken in the market were positive for the virus, concentrated in the area where wild and farmed animal trade was present

The market could be the origin of the virus or played a role as an amplifying setting for the initial spread.

Incubation period- 1 to14 days (average 5-6 days)

Mode of Transmission- COVID-19 is spread primarily from person to person through small droplets from the nose or mouth, expelled when a person with COVID-19 coughs or sneezes. People can catch COVID-19 if they breathe in these droplets, or by touching objects or surfaces where the droplets have landed, then their face.

Clinical features

Fever, cough, fatigue, shortness of breath, muscle or joint pain, sore throat, headache, chills, nausea, vomiting, diarrhoea etc.

Treatment

Most people infected with the virus will experience mild to moderate respiratory illness and recover without requiring special treatment. However, some will become seriously ill and require medical attention. Older people and those with underlying medical conditions like cardiovascular disease, diabetes, chronic respiratory disease, or cancer are more likely to develop serious illness. Anyone can get sick with COVID-19 and become seriously ill or die at any age.

Prevention

Personal measures-

1. Hand and respiratory hygiene is important at All times and is the best way to protect yourself and others.
2. When possible, maintain at least 1 meter distance between yourself and others.

Public health measures-

1. Quarantine means restricting activities or separating people who are not ill but may have been exposed to COVID-19. The goal is to prevent the spread of disease if or when people develop symptoms.
2. Isolation means separating people who are ill with symptoms of
3. COVID-19 and may be infectious to prevent the spread of the disease.
4. Physical distancing means being physically apart. WHO recommends keeping at least 1-metre distance from others. This is a general measure that everyone should take even if they are well.

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5. Contact tracing helps to identify individuals who may have been exposed to COVID-19 in order to quickly isolate them.

Leprosy

Leprosy is probably the oldest disease afflicting the mankind. Possibly it was originated in Africa and spread very early to India and from there to China. There are references in Buddhist literature. In Vedic reference it is mentioned as "Kushta Roga". It has the maximum social stigma attached to it. A common belief that leprosy is due to past sins committed by the person.

There is a belief that leprosy is hereditary and incurable. There are many misconceptions about disease that causes social aversion and ostracism against leprosy patients leading to the high deformity. But due to scientific inventions leprosy has been identified a disease that can be eradicated. Hansen of Norway during 1873 discovered leprae bacilli, therefore the disease is also known as Hansen's disease

Causative organism - Mycobacterium leprae and Mycobacterium lepromatosis are the causative agents of leprosy. they are acid fast and occur in the human host both intra-cellular and extra-cellular.

Incubation period - 3 to 5 years

Source of infection - It is generally agreed that multi bacillary cases (lepromatous and borderline lepromatus cases) are the most important source of infection in the community.

Infectivity - Leprosy is a highly infectious diseases but of low pathogenicity.

Age- Leprosy is not particularly a disease of children. Infection can take place at any time.

Sex- Leprosy is twice as common among males than among females (in the ratio of 2:1). However, the incidence is equal in both the sexes among children.

Environment factors

1. The presence of infectious cases in that environment there is evidence that humidity favors the survival of M. leprae in the environment.
2. Overcrowding and lack of ventilation with in households.

Mode of transmission

a. **Droplet infection-** There is more and more evidence that leprosy may be transmitted via aerosols containing M. leprae with the realization of the importance of the nose as a portal of exit, there has been increased emphasis on the respiratory tract as the portal of entry.

b. **Contact transmission-** Transmitted fromperson to person by close contact between an infectious patient and a healthy but susceptible person e.g. contact with soil and fomites such as contaminated cloths and linen.

c. **Other routes-** bacilli may also be transmitted by insect vectors, or by tattooing needles.

Classification - Indian classifications is official classification of Indian leprosy associated (Hindu Kushta Nivarana Sangh)

a) Indeterminate type- this denotes early cases with one or two vague hypo pigmented macules and definite sensory impairment. These lesions are bacteriologically negative.

b) Tuberculoid type- this type denotes those cases with one or two well defined lesions, which may be flat or raised hypo pigmented or erythematous and are anesthetic. The lesions are bacteriologically negative.

c) Borderline type- this type denotes those cases with four or more lesions which may be flat or raised well or ill defined, hypo pigmented or erythematous and show sensory impairment or loss. The bacteriologically positive.

d) D. lepromatus type- this type denotes those cases with diffuse infiltration or numerous flat or raised poorly defined, shiny, smooth, symmetrically distributed lesions. These lesions are bacteriologically positive.

e) Pure neuritic type- This type denotes those cases of leprosy which show nerve involvement but do not have any lesion in the skin. These case are bacteriologically negative.

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Diagnosis

There are many kinds of leprosy but there are common symptoms including:

1. Runny nose
2. Dry scalp eye problems
3. Skin lesions
4. Muscle weakness
5. Reddish skin
6. Smooth shiny diffuse thickening of facial skin, ear, and hand
7. Loss of sensation in fingers and toes
8. Thickening of peripheral nerves
9. Flat nose due to destruction of nasal cartilage.
10. There is also phonation and resonation of sound during speech.
11. Often there is atrophy of the testes and impotency.

Clinical examination

i. Interrogation
ii. Inspection -
   a. Skin smear
   b. Nasal smear
   c. Nasal scrapping
   d. Foot pad culture
   e. Histamine test
   f. Immunological test-cell mediated immunity
   g. Biopsy
   h. Lepromine test
   i. FLA- ABS test-92.3 %

Prevention

1. **Medical measures-**
   a. Estimation of the problem
   b. Early case detection
   Case finding methods-
   Contact survey-
   Group survey-
   Mass survey-

Multidrug Therapy (MDT)- In a recent trial, a single dose of rifampicin reduced the rate at which contacts acquired leprosy in the two years after contact by 57%; 265 treatments with rifampicin prevented one case of leprosy in this period. A non-randomized study found that rifampicin reduced the number of new cases of leprosy by 75% after three years.

BCG offers a variable amount of protection against leprosy as well as against tuberculosis.

Sulfone drug, e.g. Dapsone was discovered in 1943 for the treatment of leprosy. With the introduction of Multi-Drug Treatment (MDT) during 1981 this disease is very well under control and may be eradicated. Other drug used in leprosy clofazimine, ethionamide, quinolones, minocycline, clarithromycin.

Duration of treatment

Multibacillary leprosy- MB blister pack for 12 months.

Paucibacillary leprosy- PB blister pack for 6 months.

Syllabus- Epidemiological determinants, brief pathology, transmission, incubation period, clinical features, diagnosis and preventive measures of Water borne Infections / intestinal infections - Cholera, Polio, Viral Hepatitis, Typhoid.

Learning objective- Water borne Infections/ intestinal infections - Cholera, Polio, Viral Hepatitis, Typhoid.

Cholera

Cholera is an acute diarrhoeal disease caused Vibrio Cholerae due to the El tor biotype. Cholera is both an epidemic and endemic disease.

Agent Factors

Agent- Vibrio Cholerae

Resistance- V. Cholera is killed within 30 minutes by heating at 56 deg. C or within a few seconds by boiling.

Reservoir of infection- case and carrier

Infective material- stools and vomit of cases and carriers.

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Period of communicability- a case of cholera is infectious period of 7-10 days.

Host Factors

Age and sex- cholera affects all ages and both sex.

Economic status- highest in low economic groups.

Environment Factors

Vibrio transmission is readily possible in a community with poor environment sanitation.

Mode of transmission

- Faecal contaminated water.
- Contaminated food and drinks
- Direct contact

Incubation period-few hours to 5 days. But commonly 1-2 days.

Clinical Features

Cholera shows 3 stages :

1. Stage of evacuation- the onset is abrupt with profuse, painless, watery diarrhoea followed by vomiting. The patient may pass as many as 40 stools in a day. The stool may have a "rice water" appearance.

2. Stage of collapse-the patient soon passes into a stage of collapse because of dehydration. The classical signs are- sunken eyes, hollow cheeks, scaphoid abdomen, sub-normal temperature, washerman's hands and feet, absent pulse, unrecordable, blood pressure, loss of skin elasticity, shallow and quick respirations. The output of urine decreases and may ultimate cease. The patient becomes restless, and complains of intense thirst and cramps in legs and abdomen. Death may occur at this stage due to dehydration and acidosis resulting from diarrhoea.

3. Stage of recovery- if death does not occur, the patient begins to show signs of clinical improvement. The blood pressure begins to rise, the temperature return to normal, and urine secretion is re-established.

Treatment

Treatment of the infected cases must be carried out. The infection is controlled by use of antibiotics and dehydration is accordingly looked after.

An oral rehydratiom mixture is recommended by WHO.

Sodium bicarbonate- 2.5 gm
Sodium chloride 3.5 gm
Potassium chloride 1.5 gm
Glucose- 20 gm.

It mixed with 1 litre of safe and potable water and consumed in 24 hours.

Control of Cholera- It is now considered that the best way to control cholera is to develop and implement a national programme for the control of all diarrhoeal diseases because of similarities in the epidemiology, pathophysiology, treatment and control of cholera.

Guidelines for cholera control-

1. Verification of the diagnosis
2. Notification
3. Early case finding
4. Establishment of treatment centre
5. Rehydration therapy
6. Adjuncts to therapy
7. Sanitation measures
8. Vaccination
9. Health education

Poliomyelitis

Poliomyelitis is an acute viral infection caused by an RNA virus. It is primarily an infection of the human alimentary tract but the virus may infect the central nervous system in a very small percentage of cases resulting in varying degree of paralysis and possibly death.

Agent Factor

Causative Organism- polio virus which has three serological distinct types I, II, III.

Incubation period- 7-14 days

Distribution- the disease is universal, with the active immunization programme against the infection.

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Reservoir of infection- man is the only known reservoir of infection.

Infectious material- The virus is found in faeces and oropharygeal secretions of an infected person.

Period of communicability- The case are most infectious 7 to 10 days before and after onset of symptoms.

Age- the disease in all age groups, but children are usually more susceptible than adults because of acquired immunity of the adult population.

Sex- ratio is 3 males to one female.

Environmental Factors- polio is more likely to occur during the rainy season. 60% of cases recorded in India during June to September. The environmental sources of infection are contaminated water, food, files. Polio virus survives for long time in cold environment.

Mode of transmission

1. **Faecal oral route-** this is the main route spread in developing countries. The infection may spread directly through contaminated fingers where hygiene is poor, indirectly through water, milk, foods, flies and articles of daily use.
2. **Droplet infection-** this may occur in the acute phase of disease when occurs in the throat close personal contact with a infected person.

Clinical spectrum

1. In apparent (sub clinical) infection- This occurs approximately in 91-96% of poliovirus infections. There are no presenting symptoms.
2. Abortive polio or minor illness- occurs in approximately 4-8% of the infections. It causes only a mild limiting illness due to viremia. The patient recovers quickly.
3. Non- paralytic polio- occurs in approximately 1 % of all infection presenting features are stiffness and pain in the neck and back.
4. Paralytic polio- occurs in less than one percent of infections. The virus invades CNS and causes varying degree of paralysis.

In about 50% cases a lower motor neurone type paralysis develops between 2nd and 3rd day with fever. Paralysis is flaccid type. There is foot drop, facial paralysis, eye sight with loose and flaccid limbs.

Prevention

1. Notification
2. Proper disposal of urine and feces.
3. Avoid over-crowding in schools and gatherings
4. Immunization-

Vaccine

1. Inactivated (salk) polio vaccine (IPV)

This vaccine contains all three types of polio virus inactivated by formalin. The first three doses given at interval of 1-2 months and 4th dose 6-12 months after third dose. First dose usually given when infant is 6 weeks old. Additional doses are recommended prior to school entry and then every 5 years until the age of 18.

Advantage-

a. To person with immune deficiency diseases
b. To persons undergoing corticosteroid and radiation therapy.
c. To those over 50 year who are receiving vaccine for first time.
d. During pregnancy
e. Risks- no serious adverse reaction of IPV.

2. Oral (SABIN) Polio vaccine (OPV)

Oral polio vaccine was described by sabin in 1957 it contains live attenuated virus (type1, 2,3) grow in primary monkey kidney or human diploid cell culture.

Primary course of 3 doses of OPV at one month interval commencing the first dose when infant is 6 week old. It is recommended that a dose of OPV is required to be given all children delivered in health institution before discharge from hospital.

Dose & mode of administration- two drops

Advantages-

1. Since given orally it is easy administer
2. Induces both humoral and intestinal immunity

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3. Antibody quickly produced in large proportion
4. Useful in control epidemics
5. Relatively inexpensive.

Complication- OPV is free from complication

Storage

1. Stabilized vaccine- recent oral polio vaccines are het stabilized. They can be kept without losing potency for a year at 4 degree C. and for a month at room temperature.
2. Non stabilized vaccine- the vaccine should be stored at -20degree C in deep freeze. In case a deep freeze is not available it might be stored temporarily in freezing chamber of the refrigerator. During transport the vaccine must be kept either on dry ice or freezing mixture.

Viral Hepatitis

Viral hepatitis is a group systemic infection affecting the liver predominantly caused by 5 kinds of viruses at least.

Viral hepatitis may be divided into 5 types according to aetiology that is hepatitis A, B, C, D and E. Although the agents can be distinguished by its antigenic properties, the 5 kinds of viruses may produce clinical similar illness. It is acute infectious viral disease with viremia and tendency of localisation of virus in liver.

Hepatitis A

Hepatitis A is an acute infectious disease caused by hepatitis A virus (HAV). The disease is heralded by non- specific symptoms such as fever, headache, fatigue, generalised weakness and ache and pains, followed by anorexia, nausea, vomiting, dark urine and jaundice.

Causative organism- Hepatitis A virus enter virus of picornaviridae family.

Reservoir of infection- The human cases are the only reservoir of infection.

Period of infectivity- The risk of transmitting HAV is greatest from 2 weeks before to 1 week after the onset of jaundice.

Infective material- Mainly man's faeces, blood, serum and other fluid are infective during the stage of viraemia.

Virus excretion- HAV is excreted in the faeces for about 2 weeks before the onset of jaundice and for up to 2 weeks thereafter. The virus may also be excreted in urine.

Age- infection with HAV is more frequent among children than in adults.

Sex- both sexes are equally susceptible.

Environmental factors- in India the disease tends to be associated with periods of heavy rainfall.

Mode of transmission

1. Faecal oral route - this is major route of transmission. It may occur by direct contact or indirectly by way of contaminated water, food or milk, water borne transmission is not major factor in developed countries.
2. Parenteral route- hepatitis A is rarely transmitted by parenteral route (blood and blood products or by skin penetration through contaminated needles).
3. Sexual transmission - as a sexually transmitted infection hepatitis A may occur mainly among homosexual men because of oral- oral contact.

Incubation period- 10-50 days

Clinical spectrum

The onset of jaundice is often preceded by gastrointestinal symptoms such as nausea, vomiting and mild fever. Jaundice may appear within a few days of prodromal period but anicteric hepatitis is more common.

Diagnosis

Test for abnormal liver function, serum alanine, aminotransferases, bilirubin, supplement the clinical pathogenic and epidemiologic findings.

Prevention and containments

1. Control of reservoir-

a. Faecal shedding of the virus is at its height during the incubation period and early phase of illness.

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b. The occurrence of large number of subclinical cases.
c. Absence of specific treatment
d. Low socio-economic profile of the population usually involved.

Strict isolation of cases is not useful control measures. Usual control measure such as notification, complete bed rest and disinfection of faeces and fomites.

2. Control of transmission- Simple measures of personal and community hygiene i.e. hand washing before eating and after toilet. Prevention contamination of water, food, milk and purification of community water, food and milk.

3. Vaccine- The vaccine is given parenteral as a 2 dose series 6-18 month apart. The combination vaccine is given as 3 dose using 0 day, 1 month and 6th months schedule.

Hepatitis B

Hepatitis B known as "serum hepatitis". It is an acute systemic infection with major pathology in the liver, caused by hepatitis B virus and transmitted usually by parenteral route.

Hepatitis B is a endemic throughout the world especially in tropical and developing countries and also in some regions of Europe.

Agent factors

Causative organism-Hepatitis type B virus was discovered by Blumberg in 1963.

Incubation period- 7-25 weeks

Reservoir of infection-Man is the only reservoir of infection which can be spread either from carrier or from cases.

Infective material-Contaminated blood is the main source of infection, although the virus has been found in body secretions as saliva, vaginal secretions and semen of infected persons.

Mode of transmission

a. **Parental route-** hepatitis B is essentially a blood-borne infection. It is transmitted by infected blood and blood products through transfusions, dialysis, contaminated syringes and needles, pricks of skin. Handling of infected blood during surgical and dental procedures etc.
b. **Perinatal transmission-** spread of infection from HBV carrier mother to their babies appears to be an important factors for high prevalence of HBV infection in some regions particularly china and South East Asia.
c. **Sexual transmission-** there is ample evidence for the spread of infection by intimate contact or by sexual route. The sexually particular male homosexuals are at very high risk of infection with hepatitis B.
d. **Other routes-** transmission from child to child often called horizontal transmission is responsible for a majority of HBV infection.

Clinical features

The symptoms and manifestations of Hepatitis B are similar to those of the other type of viral hepatitis.

Prevention and containment

1. Avoid blood transfusion and its products, which are infected with hepatitis B virus.
2. Try to detect the carriers of diseases by tests with Australia antigens.
3. Hepatitis B vaccine-
a. Plasma B vaccine
b. RDNA derided vaccine hepatitis B immunoglobulin (HBIG).

Hepatitis-C

Hepatitis C virus (HCV) was identified in year 1989. Major cause of parenteral transmitted. WHO estimated 3% of the world population is infected with HCV and around 170 million individual are chronic carrier at risk of developing liver cirrhosis and liver cancer.

Incubation period- 40-120 days
Age distribution- adults
Seasonal incidence- throughout year
Route of infection- parenteral
Occurrence of virus- month to years

Hepatitis C virus a single stranded RNA virus with properties similar to other virus.

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The virus is mainly transmitted through transfusion of contaminated blood or blood products.

Hepatitis-D

HDV is found throughout the world but with a non-uniform distribution. It highest prevalence has been in Italy, central Asia etc.

Person who has received multiple transfusions intravenous drug abusers and their close contacts are at high risk.

Incubation periods- 2-12 weeks.

Hepatitis-E

The infection caused by the hepatitis E virus (HEV) which was discovered in 1980, is essentially a water-borne disease. Formerly termed enterically transmitted hepatitis non-A non-B, HEV is a 29 - nm to 32-nm RNA virus. Water or food supplies, contaminated by faeces, in which the virus excreted, have been implicated in major outbreaks reported in all parts of the world that have a hot climate.

Incubation period- 2-9 weeks

Age- young adult, aged 15-40 years.

Distribution - developing countries

No vaccine or specific immunoglobulin prophylaxis is available.

Hepatitis-G

HGV was discovered recently in 1996. The prevalence of this infection is not known.

Typhoid and Parathphoid Fever

Typhoid fever is the result of systemic infection mainly by S. typhi found only in man. The disease is clinically characterised by a typical continuous fever for 3 to 4 weeks relative bradycardia with involvement of lymphoid tissue and considerable constitutional symptoms. The term "Enteric fever" includes both typhoid and paratyphoid fevers. The disease may occur sporadically, epidemically or endemically.

Causative organism- salmonella typhi, S. Paratyphi A, S. Paratyphi B.

Reservoir of infection- man is the only known reservoir of infection viz. cases and carrier's organism is faeces and urine. In carrier the most common infected focus is gallbladder.

Source of infection- The primary sources of infection are faeces and urine of cases or carrier the secondary source contaminated water, food, fingers and flies.

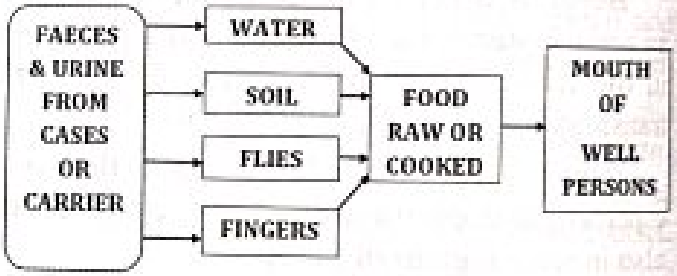
Incubation period- 10-14 days, but it may be as short as 3 days or as long as three weeks.

Seasonal incidence- incidence is reported during July to September.

Mode of transmission-

1. Faecal route-
2. Urine oral route-

This may place directly through soiled hands contaminated with faeces or urine of cases or carriers. Indirectly the ingestion of contaminated water, milk, food etc.



Clinical features

During prodromal stage there is malaise, headache, cough and sore throat, often with abdominal pain and constipation. The fever ascends in a stepladder fashion. After about 7-10 days. Fever reaches plateau, weakness, "pea soup", diarrhoca may be present along with distension of abdomen, leukopenia and blood, urine and stool culture is positive for salmonella.

Laboratory diagnosis of typhoid

a. Microbiological procedure- S. typhi from blood bone marrow and stools. Blood culture is the diagnosis this disease.

b. Serological procedure- felix-widal test measures agglutinating antibody level against and H antigens. O antibodies appear on the

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day 6-8 and H antibodies on day 10-12 after the onset of disease.

c. New diagnostic tests- typhoid fever as an alternative to a widal teat include the IDL Tubex test marked by Swedish company. This reportedly can detect lgMOg antibodies from patient within a few minutes. Another rapid serological test "Typhi Dot".

Control of Typhoid Fever

1.Control of reservoir

Cases- early diagnosis, notification, isolation.

Treatment- fluaroquinoinones are widely regarded as the drug of choice for the treatment of typhoid fever. Along with chloramphenicol, ampicillin, amoxicillin and trimethoprim-sulfamethnoxazole.

Disinfection- stools and urine are the sole source of infection, they should be received in closed container and disinfected with 5% cresol for at ;east 2 hours.

Follow up- examination of stools and urine should be done for S. typhi 3 to 4 month after 12 month to prevent the development of the carrier state.

Carriers- Identification- carrier is identified by cultural and serological examinations. Treatment- intensive course of ampicillin or amoxicillin 4-6gm per day.

2. Control of sanitation

Protect and purification of drinking water supplies improvement of basic sanitation and promotion of food hygiene are essential measures to interrupt transmission of typhoid fever.

3. Immunization

Anti-typhoid vaccines,

1. The Vi-polysaccride vaccine]
2. The Ty 21 a vaccine

Syllabus- Epidemiological determinants, brief pathology, transmission, incubation period, clinical features, diagnosis and preventive measures of Intestinal infestations - Ascariasis, Hook worm and Tape worm.

Learning objective- Intestinal infestations - Ascariasis, Hook worm, Tape worm4. Emerging and re-emerging diseases.

Ascariasis

Ascariasis is a common helmenthic infection in man.

Causative organism: Ascaris lumbricoids

Incubation period: About 2 months.

Mode of transmission: Faecal - oral route i.e. by ingestion of infection eggs with food or drink.

Clinical manifestations

- General weakness and his body become pale.
- Loss of appetite
- Occasional vomiting
- Flatulence
- Live worm may be passed in the vomit or stools.
- Sometimes patient may have an asthmatic attack.

Treatment

The drugs of choice are Tablet piperzine and Mebendazole.

Prevention and control

- Use of sanitary latrines
- Efficient sewage disposal
- Maintain personal hygiene
- Hand washing with soap and water after defecation and before eating.
- Washing vegetables and fruits before eating them raw..
- Protection of food from flies.
- Avoid pollution of the soil and water supply.

Hook Worm

Hookworm disease is a chronic infestation of small intestine. They may occur as single or mixed infections in the same person.

Causative organism:

- Ancylostoma duodenale
- Necator americanus

Incubation period: Six weeks

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Mode of transmission: Infective larvae from soil enter the human host by piercing the skin of bare foot.

Clinical manifestations

- Hookworms occur in the small intestine, particularly jejunum. They cause small ulcers in the intestine and cause chronic blood loss, leads to iron deficiency Anemia.
- Weakness, puffiness of the face.
- Flatulence, constipation with alternate diarrhoea and pain in the abdomen.
- Odema of legs and palpitation.
- Pallor of the whole body, tongue and conjunctiva.
- Slight fever
- Loss of appetite
- Malnutrition
- Infected children may have retarded mental and physical development leading to delayed puberty.
- Affected persons have low body resistance.

Treatment

- The drug of choice is Tablet- Mebendazole.
- Hookworm anaemia is treated with iron and folic acid.
- Prevention and control measures
- Sanitation measures
- Sanitary latrines
- Efficient sewage disposal
- Disinfection of all faeces to avoid contamination water and soil.
- Maintain personal hygiene and cleanliness.
- Wear chapels whenever going out.
- Vegetables and fruits must be washed properly before eating.
- Educate people about the spread, danger and prevention of this disease.

Tape Worm

A tapeworm is a parasite that can live and feed in human intestines. This is called a tapeworm infection. A young and inactive form of the tapeworm is called a larval cyst. It can stay alive in other parts of the body. This is called a larval cyst infection.

A tapeworm in the intestines often causes mild symptoms. Moderate to severe symptoms may include stomach pain and diarrhoea. Larval cysts can cause serious disease if they are in a person's brain, liver, lungs, heart or eyes.

Tapeworm infection in the intestines

A tapeworm in the intestines may cause no symptoms. The severity of symptoms depends in part on the number of tapeworms. Symptoms vary. And some symptoms are more likely with some species of tapeworm. Symptoms may include:

1. Upset stomach, or feeling like you could throw up.
2. Stomachache or stomach pain.
3. Not wanting to eat.
4. Loose stools.
5. Diarrhea.
6. Weight loss.
7. Gas.
8. Hunger pains.
9. Cravings for salty food.

Larval cyst infection

Symptoms of larval cyst infection depend on where they are causing disease in the body.

Larval cysts in the brain or spine. These may cause:

1. Headache.
2. Seizures.
3. Dizziness.
4. Nerve pain in the spine or limbs.
5. Muscle weakness.
6. Poor coordination.
7. Changes in thinking or behaviors.

Complications

1. Anemia
2. Blockage
3. Anxiety
4. Severe allergic reaction

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Treatment

Anthelmintics drugs

Prevention-

1. Wash your hands
2. Wash fruits and vegetables
3. Wash kitchen utensils well
4. Don't eat raw or uncooked meat or fish

Acute Diarrhoeal Diseases

Diarrhoea is an acute or chronic intestinal disturbance characterized by passing of more thanthree bulk motions in a day or 24 hours.

Causative organism

Bacteria: Escherichia coli, Shigella, salmonella etc.

Virus: Rota virus, adenovirus etc.

Parasites: Entameoba hystolytica, Giardia lamblin etc.

Mode of transmission

Faeco - oral route

Direct transmission

Incubation period: Few hours

Clinical manifestation

1. Stools loose and fluid in consistency, greenish or yellowgreen in colour, may contain mucus or blood.
2. Vomiting
3. Fever
4. Poor skin turgor, dry skin and dry mouth
5. Sunken fontanelles in children.
6. Sunken eyes
7. Tachycardia
8. Hypotension
9. Irritable and restlessness
10. Pallor
11. Rapid respiration
12. Sudden collapse if not treated properly

Treatment

Oral rehydration therapy: Give home available liquids like rice water, oral rehydration solution packet to be dissolved in one litre of drinking water and stir with clean spon, till it dissolves. Give to cup after every loose motion to a child less than 2 years of age and 100-200 ml if the child is above 2 years. The solution should be consumed within 24 hours and should not be heated or boiled.

Appropriate feeding

a. Coconut water
b. Rice water
c. Dhal water
d. Mashed banana
e. Water tea
f. Breakfast feeding to be continued.

Appropriate drugs

- Bacterial infection : Ampicillin, chloramphenicol
- Symptomatic treatment for fever, vomiting etc.
- Protozol infection - metronidazole.
- Intravenous infusion to severly dehydrated clients.

Food Poisoning

Food poisoning is an acute gastro enteritis caused by the ingestion of living bacteria or their toxins. (e.g) Salmonella, staphylococcal, clostridium, botulinum.

Incubation period: One hour to 24 hours.

Clinical manifestation

Vomiting, nausea, retching, abdominal tenderness, dehydration, hyperthermia, head ache, tachycardia, frequent stools may contain mucus and blood, undigested food particles and offensive in nature.

Treatment

Fluid replacement with oral rehydration solution and intravenous fluids if necessary. Antibiotics as prescribed by the physician. Easily digestable, bland liquid diet.

Control measures

1. Food sanitation- Meat inspection: The food animals must be free from infection.

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2. Personal hygiene: A high standard of personal hygiene among individuals engaged in the handling, preparation and cooking of food is needed.
3. Food handlers: Those suffering from infected wounds, boils, diarrhea, dysentery, throat infection etc., should be excluded from food handling. The medical inspection of food handlers is required.
4. Food handling techniques: The handling of ready to eat foods with bare hands should be reduced to a maximum.
5. Health education: Food handlers should be educated in matters of clean habits and personal hygiene, such as frequent and through hand washing.
6. Refrigeration: Proper temperature control in the prevention of bacterial food poisoning. Food should not be left in warm pantries. Cook and eat the same day is a golden rule. Coldis bacteriostatic at temperature below 4oC and refrigeration temperature should not exceed this level.

Amoebiasis

Amoebiasis is a common infection of the human gastro intestinal tract.

Causative organism: Entamoeba histolytica.

Incubation period: As long as the cysts are excreted, the period may be several years, if cases are unrecognized and untreated.

Mode of transmission- Faecal - oral route. Sexual transmission among male homosexuals. Flies, cockroaches, rodents and contaminated food and drinks.

Clinical features

- Colicky abdominal pain.
- Diarrhoea: watery foul smelling stool containing blood streaked mucus.

Treatment

Flagyl 800 mg thrice daily for 5 to 7 days.

Control measures :

- Sanitary disposal of human excreta.
- Provision of safe and adequate drinking water.
- Hygienic kitchen practice.
- Protection of food against flies.
- Periodic examination of food handlers.
- Health education regarding, Proper toilet habits, Releasing and protecting vegetables and fruits. Controlling insects.

Preventive measures- Periodic deworming at intervals of 2 to 3 months.

Syllabus- Epidemiological determinants, brief pathology, transmission, incubation period, clinical features, diagnosis and preventive measures of Emerging and re-emerging diseases. Explain Role of Ayurveda in Epidemics like COVID-19, Zika Virus, H1N1, H3N2, etc,

Learning Objective- Explain Role of Ayurveda in Epidemics like COVID-19, Zika Virus, H1N1, H3N2, etc.

Emerging and Re-emerging Diseases

Emerging infectious disease- Newly identified & previously unknown infectious agents that causes public health problems either locally or internationally.

Re-emerging infectious disease- Infectious agents that have been known for some time, had fallen to such low levels that they were no longer considered public health problems & are now showing upward trends in incidence or prevalence worldwide.

Emerging infectious diseases are those whose incidence has increased over the past 30 years. Some are diseases that have never been seen before. Some were previously documented but without a known aetiology. More than 30 new diseases have been identified in the past 30 years, including:

Factors Contributing to Emergence-

Agent

Evolution of pathogenic infectious agents (microbial adaptation & change)

Development of resistance to drugs

Resistance of vectors to pesticides

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Host

- Human demographic change (inhabiting new areas)
- Human behaviour (sexual & drug use)
- Human susceptibility to infection (Immuno-suppression)
- Poverty & social inequality

Environment

- Climate & changing ecosystems
- Economic development & Land use (urbanization, deforestation)
- Technology & industry (food processing & handling)
- International travel & commerce
- Breakdown of public health measure (war, unrest, overcrowding)
- Deterioration in surveillance systems (lack of political will)

Transmission of Infectious Agent from Animals to Humans

More than 2/3rd emerging infections originates from animals- wild & domestic. Emerging Influenza infections in Humans associated with Geese, Chickens & Pigs

Animal displacement in search of food after deforestation/ climate change (Lassa fever)

Humans themselves penetrate/ modify unpopulated regions- come closer to animal reservoirs/ vectors (Yellow fever, Malaria).

Climate & Environmental Changes

- Deforestation forces animals into closer human contact- increased possibility for agents to breach species barrier between animals & humans
- El Nino- Triggers natural disasters & related outbreaks of infectious diseases (Malaria, Cholera)
- Global warming- spread of Malaria, Dengue, Leishmaniasis, Filariasis
- Uncontrolled Urbanization & Population Displacement-
- Growth of densely populated cities- substandard housing, unsafe water, poor sanitation, overcrowding, indoor air pollution (>10% preventable ill health)
- Problem of refugees & displaced persons
- Diarrhoeal & Intestinal parasitic diseases, ARI, Lyme disease (B. burgdorferi) - Changes in ecology, increasing deer populations, suburban migration of population

Human Behaviour

- Unsafe sexual practices (HIV, Gonorrhoea and Syphilis)
- Changes in agricultural & food production patterns- food-borne infectious agents (E. coli)
- Increased international travel (Influenza)
- Outdoor activity.

Emerging Infectious Diseases and Re-emerging Infectious Diseases

- AIDS
- Tuberculosis
- Cholera
- Malaria
- Kala- azar
- Dengue, DHF and DSS
- Hepatitis B,C and E
- Schistosomiasis
- Japanese encephalitis
- Ebola Hemorrhagic fever
- Rabies
- Legionnaire Disease Lyme Disease
- Influenza
- Antimicrobial resistance
- Severe Acute Respiratory Syndrome- SARS

Zika Virus

Zika virus is a mosquito-borne virus first identified in Uganda in 1947 in a Rhesus macaque monkey followed by evidence of infection and disease in humans in other African countries in the 1950s. From the 1960s to 1980s, sporadic human infections were detected across Africa and Asia. However, since 2007 outbreaks of Zika virus disease have been recorded in Africa, the Americas, Asia and the Pacific.

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Mode of Transmission

Zika virus is primarily transmitted by infected mosquitoes of the Aedes (Stegomyia) genus, mainly Aedes aegypti, in tropical and subtropical regions. Aedes mosquitoes usually bite during the day. These mosquitoes also transmit dengue, chikungunya and urban yellow fever.

Zika virus is also transmitted from mother to fetus during pregnancy, as well as through sexual contact, transfusion of blood and blood products, and possibly through organ transplantation.

Symptoms

Most people infected with Zika virus do not develop symptoms. Among those who do, they typically start 3-14 days after infection, are generally mild including rash, fever, conjunctivitis, muscle and joint pain, malaise and headache, and usually last for 2-7 days. These symptoms are common to other arboviral and non-arboviral diseases; thus, the diagnosis of Zika virus infection requires laboratory confirmation.

Treatment

There is no specific treatment available for Zika virus infection or disease. People with symptoms such as rash, fever or joint pain should get plenty of rest, drink fluids, and treat symptoms with antipyretics and/or analgesics. Nonsteroidal anti-inflammatory drugs should be avoided until dengue virus infections are ruled out because of bleeding risk.

Prevention

1. No vaccine is yet available for the prevention or treatment of Zika virus infection.
2. Protection against mosquito bites during the day and early evening is a key measure to prevent Zika virus infection, especially among pregnant women, women of reproductive age and young children.

Swine Flu

Swine flu which is called pig flu. Swine flu and is caused by swine influenza virus.

Causative organism: It is caused by swine influenza virus subtypes H1N1, H1N2, H3N1 and H3N2.

Mode of transmission: Influenza virus can be directly transmitted from pigs to people .

Incubation period: Within 7 days.

Clinical features- Fever, Sore throat, Cough, Body ache, Fatigue, Nausea, Chills, Headache, and shortness of breath.

Prevention's control measures

- Adequate amount of sleep and nutritious food.
- Consider taking multivitamins and vitamin C supplement.
- Early detection and early treatment
- Through cooking of beef and pork is the most effective method to prevent food borne infection.
- Regularly wash your hands with soap and water.
- Avoid close contact or stay away from sick people.
- Avoid sharing drinks or utensils.
- Avoid touching your face.
- Wear a face mask as direction by authorities.
- Stay updated and avoid travelling to affected areas.

Treatment

- Vaccination- Vaccination is the best protection against contracting the set vaccines as soon as possible.
- Antiviral drugs can be used for prevention or treatment of flu viruses.

Syllabus- Epidemiological determinants, brief pathology, transmission, incubation period, clinical features, diagnosis and preventive measures of Sexually transmitted diseases (STDs) with prevention and control - HIV/ AIDS, Syphilis and Gonorrhea.

Learning objective- Sexually transmitted diseases (STDs) with prevention and control - HIV/ AIDS, Syphilis and Gonorrhea.

The sexually transmitted diseases are a group communicable disease that are transmitted predominantly by sexual contact and caused by a wide range of bacterial, viral, protozoal and fungal agents and ectoparasites.

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AIDS- Acquired Immuno-deficiency Sydrome

Sometime called as slim disease is a fatal illness caused by a retrovirus known as human immune deficiency virus (HIV).

Problem of AIDS and HIV

2007- Number of people living with HIV

Total- 33.2 million

Death- 2.1millions

Analysis of surveillance data-

Group I- generalized epidemic, incidence cross 5% in high risk group 1% or more in pregnant.

Group II- concentrated epidemic incidence 5% in high risk group and in pregnant less than 1%.

Group III- low prevalence epidemic incidence reach 5% in high risk group and in pregnancy less than 1%.

Causative organism- human immune-deficiency virus

Reservoir of infection- case and carrier. Once infection life time infected.

Source of infection- blood, semen, CSF, lower concentration in saliva, tears, milk, urine, cervical and vaginal secretion.

Incubation period- few months to 6 years

Host factor

Age -most 20-49 years

Sex- in North America, Europe, Australia, Africa etc.

High risk group- male homosexual and bisexual, hetero sexual partners. Intravenous drug abusers, transfusion, recipients of blood and blood products.

Mode of transmission-

- Sexual
- Blood contact
- Maternal

Clinical manifestations

1. Initial infection- 70% of people after few weeks of exposure develop mild illness, fever, sore throat and rash. But most are asymptomatic up to first five years.

HIV antibodies appear between 2-12 week in the blood stream and period up to this is called 'window period' tests are negative for antibody test, but patient has HIV infection.

2. Asymptomatic carrier- condition with no clinical sign but persistent generalized lymphadenopathy.

3. AIDS related symptom complex ARC- one or more clinical sign are present, unexplained diarrhea lasting longer than a month, fatigue, malaise, loss of more than 10% of body weight , fever, night sweats, milder opportunistic infection like oral through generalized lymphadenopathy or splenomegaly.

4. AIDS-end stage of HIV infection, number of opportunistic infections occurs I body. Tuberculosis and Kaposi sarcoma develop in early stage.

Candida esophagitis, Cryptococcus meningitis and penicillosis, pneumonia. Toxoplasma gondi and encephalitis when T-cells reach around 100. Chronic diarrhea, sever loss of weight, AIDS encephalopathy, dementia, herpes zoster, also may develop.

Control methods in AIDS

1. Sexual discretion- anal sex, multiple sex partners and sex with person infected or suspected to have AIDs should avoid or minimized.
2. Blood and blood products should be kept free from AIDS infection.
3. Blood transfusion should be given only when strictly indicated.
4. Hemophiliacs should give heat treated preparations instead of coagulation factor concentrates.
5. Health education
6. Free and anonymous HIV testing counselling and referral services should be routinely made available at places such as STD clinics, Drug treatment clinics etc.

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Sexually Transmitted Diseases

Five classical Venereal diseases (syphilis, gonorrhoea, lymph granuloma venerum and donovanosis).

Among STD's Gonorrhoea, syphilis and cancroids are important incidence-

Gonorrhoea- 62 million
Syphilis -12 million
Cancroid- 7 million

Syphilis

Causative organism- Treponema pallidum

Mode of transmission - abrasion in skin, mucous membrane, blood transfusion, tattooing, kissing, hukka etc. and vertical route mother to foetus. Technical worker also may get by accidental incidence.

Incubation period- 14-28 days

Classification of syphilis

Primary syphilis- incubation period- 9-10 days

The primary lesion begins with single small pink macule, late on it becomes popular and ulcerates at the site of infection, usually on genitalia, the ulcer is painless, does not bleed easily on touch.

The regional lymph nodes are enlarged and is pain less. The primary lesion is also called hard chancre the usual sites of ulcer in males are cornal sulcus of penis, the glans penis.

In females the labia majora, labia minora, cervix, urethral orifices and clitoris are usual sites. Extra genital ulcers is seen in 10 % cases it may be found on finger, tongue, nipples, rectum, lips, anus.

Secondary syphilis- After 6-8 weeks of appearance of primary syphilis the secondary syphilis develops. It starts with mild fever, headache, vomiting.

Four important sign in secondary syphilis-

1. Skin rashes- appearance of skin rashes start with macular lesion on proximal limbs and trunks further develop to generalize popular rash. The rash is asymptomatic, symmetrical and not itchy. These lesions progress to necrotic ulcers, the palm and sole are affected. Skin rash appear about 75% of cases.
2. Generalized lymphadenopathy - generalized, firm, non-tender lymphadenopathy occur in 50% cases.
3. Condylomata lata- in warm and moist area such as perianal area, vulva, scrotum, inner thigh. Axillae and skin under pendulous breast papules can enlarge and become eroded and produce moist pink or gray white lesions called condylomata lata.
4. Mucus patches- superficial mucosal erosions called mucus patches occur in lips, oral, mucosa, tongue, palate, pharynx, vagina, vulva, glen penis. This secondary stage is also self-limited. The sign and symptoms disappear without any treatment and no evidence of disease remains except positive serological teat for syphilis.

Late syphilis-tertiary stage- if affects the skin, mucosa and bones the characteristics feature is granulomatous lesion called gumma. This takes more than 10 years to appear the symptoms.

Quaternary stage- cardiovascular syphilis and neuro syphilis are included in this stage.

Congenital syphilis- transmission of syphilis infection to foetus from mother through placenta may occur at any stage of pregnancy. Usually 16th week of pregnancy.

Investigation

- Non- specific -VDRL test
- RPR- rapid plasma regain test
- Specific- Treponema Pallidum is demonstrable infectious lesion by dark microscopy.
- Direct fluorescent antibody Treponema Pallidum Absorption test.
- TPHA- T-P- haemoglatin in tests.

Treatment-

Primary stage-

- Penicillin -600-1200 mg IM once daily for 12 days.
- Doxycycline -100 mg orally 8 hourly for 15 days.

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Gonorrhea

The acute stage is characterised by inflammation of urethra in male and of urethra, cervix and vagina in females. There is acute burning sensation with pain and pus discharge while passing urine. Later the pus becomes thin and persists lifelong.

Causative organism- Neisseria Gonorrhoea.

Incubation period- 2-10 days

Clinical feature

In male- anterior urethra is common site for infection: ureteral discharge and dysuria are the features. On examination mucopurulent urethral discharge is present. In 10 % cases symptoms are absent. Male homosexuals are usually asymptomatic with anal discomfort, discharge, rectal discharge, bleeding and inflamed rectal mucosa and mucopus.

In female- Para urethral glands or ducts, bartholins gland or ducts, endo cervical canal are inflamed, rectum may be inflamed in anal sex, 50% are symptomatic vaginal discharge, dysuria, lower abdominal pain, inter menstrual bleeding and PID are the features.

Investigation- smears of infected site reveal germ negative gonococcal.

Complication- acute prostitis, bartholins gland abscess, PID, infertility, ectopic pregnancy etc.

Treatment

Preventive-

1. Adequate therapy for gonococcal infection
2. To treat adequate the male sexual partner simultaneously
3. Avoid multiple sex partners
4. Condom toll both sexual partners are free from diseases.

Curative-

- Ceftriaxone -250 mg I/M 7 days
- Ciprofloxacin 500mg orally 7 days
- Ofloxacin- 400 mg orally 7days
- Ampicillin -3gm orally 7 days etc.

Chanchroid

Organism - Haemophilus ducreyl

Sign- after infection a small papule develops at the site of inoculation, normally with 2-3 days. Lesion are deep ulceration is extremely painful.

Treatment-Ciprofloxacin, erythromycin, azithromycin etc.

Trichomoniasis

Organism- Trichomonas Vaginalis

Symptoms- Vaginitis, Viginal discharge

Treatment- metronidazole, Tinidazole.

Chlamydial Infection

Organism- Chalmydia Trachomatis

Symptoms- Urethritis, cervicitis, procititis, epididymitis, infant pneumonia, PID, neonatal conjunctivitis.

Treatment- antibiotics used- Ciprofloxacin, erythromycin, azithromycin

Donovanosis

Organism- Calymmatobacterium Granulomatis

Incubation period- 3-40 days

Treatment- Ciprofloxacin, erythromycin, azithromycin

Syllabus- Role of ayurveda in the prevention and control with recent research updates of lifestyle diseases such as dm, obesity, coronary artery disease (cad) and cancer

Learning objectives- Explain the role of Ayurveda in the prevention and control with recent research updates of Lifestyle diseases such as DM, Obesity, Coronary artery disease (CAD) and Cancer

Non-communicable diseases (NCDs), also known as chronic diseases, are not passed from person to person. They are of long duration and generally slow progression.

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The 4 main types of non-communicable diseases are cardiovascular diseases (like heart attacks and stroke), cancers, chronic respiratory diseases (such as chronic obstructed pulmonary disease and asthma) and diabetes.

NCDs already disproportionately affect low- and middle-income countries where nearly three quarters of NCD deaths - 28 million - occur.

All age groups and all regions are affected by NCDs. NCDs are often associated with older age groups, but evidence shows that 16 million of all deaths attributed to non-communicable diseases (NCDs) occur before the age of 70. Of these "premature" deaths, 82% occurred in low- and middle-income countries. Children, adults and the elderly are all vulnerable to the risk factors that contribute to non-communicable diseases, whether from unhealthy diets, physical inactivity, exposure to tobacco smoke or the effects of the harmful use of alcohol.

These diseases are driven by forces that include ageing, rapid unplanned urbanization, and the globalization of unhealthy lifestyles. For example, globalization of unhealthy lifestyles like unhealthy diets may show up in individuals as raised blood pressure, increased blood glucose, elevated blood lipids, and obesity. These are called 'intermediate risk factors' which can lead to cardiovascular disease, a NCD.

Diabetes

More than 346 million people worldwide have diabetes. There is an emerging global epidemic of diabetes that can be traced back to rapid increases in overweight, obesity and physical inactivity. Diabetes is a chronic disease that occurs either when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces. Insulin is a hormone that regulates blood sugar.

Hyperglycaemia, or raised blood sugar, is a common effect of uncontrolled diabetes and over time leads to serious damage to many of the body's systems, especially the nerves and blood vessels.

In 2014, 9% of adults 18 years and older had diabetes. In 2012 diabetes was the direct cause of 1.5 million deaths. More than 80% of diabetes deaths occur in low- and middle-income countries.

Type 1 diabetes

Type 1 diabetes (previously known as insulin-dependent, juvenile or childhood-onset) is characterized by deficient insulin production and requires daily administration of insulin. The cause of type 1 diabetes is not known and it is not preventable with current knowledge.

Symptoms include excessive excretion of urine (polyuria), thirst (polydipsia), constant hunger, weight loss, vision changes and fatigue. These symptoms may occur suddenly.

Type 2 diabetes

Type 2 diabetes (formerly called non-insulin-dependent or adult-onset) results from the body's ineffective use of insulin. Type 2 diabetes comprises 90% of people with diabetes around the world, and is largely the result of excess body weight and physical inactivity.

Symptoms may be similar to those of Type 1 diabetes, but are often less marked. As a result, the disease may be diagnosed several years after onset, once complications have already arisen. Until recently, this type of diabetes was seen only in adults but it is now also occurring in children.

Gestational diabetes

Gestational diabetes is hyperglycaemia with blood glucose values above normal but below those diagnostics of diabetes, occurring during pregnancy. Women with gestational diabetes are at an increased risk of complications during pregnancy and at delivery. They are also at increased risk of type 2 diabetes in the future.

Gestational diabetes is diagnosed through prenatal screening, rather than reported symptoms.

Impaired glucose tolerance (IGT) and impaired fasting glycaemia (IFG)

Impaired glucose tolerance (IGT) and impaired fasting glycaemia (IFG) are intermediate conditions in the transition between normality and diabetes.

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People with IGT or IFG are at high risk of progressing to type 2 diabetes, although this is not inevitable.

Common Consequences of Diabetes

Over time, diabetes can damage the heart, blood vessels, eyes, kidneys, and nerves.

Diabetes increases the risk of heart disease and stroke. In a multinational study, 50% of people with diabetes die of cardiovascular disease (primarily heart disease and stroke).

Combined with reduced blood flow, neuropathy (nerve damage) in the feet increases the chance of foot ulcers, infection and eventual need for limb amputation.

Diabetic retinopathy is an important cause of blindness, and occurs as a result of long-term accumulated damage to the small blood vessels in the retina. One present of global blindness can be attributed to diabetes. Diabetes is among the leading causes of kidney failure. The overall risk of dying among people with diabetes is at least double the risk of their peers without diabetes.

Prevention

Simple lifestyle measures have been shown to be effective in preventing or delaying the onset of type 2 diabetes. To help prevent type 2 diabetes and its complications, people should:

1. Achieve and maintain healthy body weight;
2. Be physically active - at least 30 minutes of regular, moderate-intensity activity on most days. More activity is required for weight control;
3. Eat a healthy diet of between 3 and 5 servings of fruit and vegetables a day and reduce sugar and saturated fats intake;
4. Avoid tobacco use - smoking increases the risk of cardiovascular diseases.

Diagnosis and treatment

Early diagnosis can be accomplished through relatively inexpensive blood testing.

Treatment of diabetes involves lowering blood glucose and the levels of other known risk factors that damage blood vessels. Tobacco use cessation is also important to avoid complications.

Obesity

Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health.

Body mass index (BMI) is a simple index of weight-for-height that is commonly used to classify overweight and obesity in adults. It is defined as a person's weight in kilograms divided by the square of his height in meters (kg/m2).

The WHO definition is:

A BMI greater than or equal to 25 is overweight

A BMI greater than or equal to 30 is obesity.

BMI provides the most useful population-level measure of overweight and obesity as it is the same for both sexes and for all ages of adults. However, it should be considered a rough guide because it may not correspond to the same degree of fatness in different individuals.

Facts about overweight and obesity

Some recent WHO global estimates follow.

In 2014, more than 1.9 billion adults, 18 years and older, were overweight. Of these over 600 million were obese.

Overall, about 13% of the world's adult population (11% of men and 15% of women) were obese in 2014.

In 2014, 39% of adults aged 18 years and over (38% of men and 40% of women) were overweight.

The worldwide prevalence of obesity more than doubled between 1980 and 2014.

Overweight and obesity are linked to more deaths worldwide than underweight. Most of the world's population live in countries where overweight and obesity kill more people than underweight (this includes all high-income and most middle-income countries).

The fundamental cause of obesity and overweight is an energy imbalance between calories

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consumed and calories expended. Globally, there has been:

1. An increased intake of energy-dense foods that are high in fat; and
2. An increase in physical inactivity due to the increasingly sedentary nature of many forms of work, changing modes of transportation, and increasing urbanization.

Changes in dietary and physical activity patterns are often the result of environmental and societal changes associated with development and lack of supportive policies in sectors such as health, agriculture, transport, urban planning, environment, food processing, distribution, marketing and education.

Raised BMI is a major risk factor for non-communicable diseases such as:

1. Cardiovascular diseases (mainly heart disease and stroke), which were the leading cause of death in 2012
2. Diabetes
3. Musculoskeletal disorders (especially osteoarthritis - a highly disabling degenerative disease of the joints)
4. Some cancers (endometrial, breast, and colon).

The risk for these non-communicable diseases increases, with an increase in BMI.

Childhood obesity is associated with a higher chance of obesity, premature death and disability in adulthood. But in addition to increased future risks, obese children experience breathing difficulties, increased risk of fractures, hypertension, early markers of cardiovascular disease, insulin resistance and psychological effects.

Prevention and control- At the individual level, people can:

1. Limit energy intake from total fats and sugars;
2. Increase consumption of fruit and vegetables, as well as legumes, whole grains and nuts;
3. Engage in regular physical activity (60 minutes a day for children and 150 minutes per week for adults).

Individual responsibility can only have its full effect where people have access to a healthy lifestyle. Therefore, at the societal level it is important to:

1. Support individuals in following the recommendations above, through sustained political commitment and the collaboration of many public and private stakeholders;
2. Make regular physical activity and healthier dietary choices available, affordable and easily accessible to all - especially the poorest individuals.

The food industry can play a significant role in promoting healthy diets by:

1. Reducing the fat, sugar and salt content of processed foods;
2. Ensuring that healthy and nutritious choices are available and affordable to all consumers;
3. Practicing responsible marketing especially those aimed at children and teenagers;
4. Ensuring the availability of healthy food choices and supporting regular physical activity practice in the workplace.

Hypertension

Hypertension, also known as high or raised blood pressure, is a condition in which the blood vessels have persistently raised pressure. Blood is carried from the heart to all parts of the body in the vessels. Each time the heart beats, it pumps blood into the vessels. Blood pressure is created by the force of blood pushing against the walls of blood vessels (arteries) as it is pumped by the heart. The higher the pressure the harder the heart has to pump.

High blood pressure increases the risk of heart attacks, strokes and kidney failure. However, hypertension is treatable and preventable.

Uncontrolled hypertension can also cause blindness, irregularities of the heartbeat and heart failure. The risk of developing these complications is higher in the presence of other cardiovascular risk factors such as diabetes. One in three adults has high blood pressure in WHO's South-East Asia

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Region. Nearly 1.5 million people die due to high blood pressure every year making it a leading risk factor for mortality in the Region.

However, hypertension is preventable and treatable. In some developed countries, prevention and treatment of hypertension, together with other cardiovascular risk factors, has brought about a reduction in deaths from heart disease.

The risk of developing hypertension can be reduced by:

1. Reducing salt intake
2. Eating a balanced diet
3. Avoiding harmful use of alcohol
4. Regular physical activity
5. Maintaining a healthy body weight
6. Avoiding tobacco use

Coronary Heart Diseases

Cardiovascular disease is caused by disorders of the heart and blood vessels, and includes coronary heart disease (heart attacks), cerebrovascular disease (stroke), raised blood pressure (hypertension), peripheral artery disease, rheumatic heart disease, congenital heart disease and heart failure. The major causes of cardiovascular disease are tobacco use, physical inactivity, an unhealthy diet and harmful use of alcohol.

Cardiovascular diseases (CVDs) are a group of disorders of the heart and blood vessels and they include:

1. Coronary heart disease - disease of the blood vessels supplying the heart muscle;
2. Cerebrovascular disease - disease of the blood vessels supplying the brain;
3. Peripheral arterial disease - disease of blood vessels supplying the arms and legs;
4. Rheumatic heart disease - damage to the heart muscle and heart valves from rheumatic fever, caused by streptococcal bacteria;
5. Congenital heart disease - malformations of heart structure existing at birth;
6. Deep vein thrombosis and pulmonary embolism - blood clots in the leg veins, which can dislodge and move to the heart and lungs.

Heart attacks and strokes are usually acute events and are mainly caused by a blockage that prevents blood from flowing to the heart or brain. The most common reason for this is a build-up of fatty deposits on the inner walls of the blood vessels that supply the heart or brain. Strokes can also be caused by bleeding from a blood vessel in the brain or from blood clots. The cause of heart attacks and strokes are usually the presence of a combination of risk factors, such as tobacco use, unhealthy diet and obesity, physical inactivity and harmful use of alcohol, hypertension, diabetes and hyperlipidaemia.

Symptoms of heart attacks and strokes

Often, there are no symptoms of the underlying disease of the blood vessels. A heart attack or stroke may be the first warning of underlying disease. Symptoms of a heart attack include:

- Pain or discomfort in the centre of the chest;
- Pain or discomfort in the arms, the left shoulder, elbows, jaw, or back.
- In addition the person may experience difficulty in breathing or shortness of breath; feeling sick or vomiting; feeling light-headed or faint; breaking into a cold sweat; and becoming pale. Women are more likely to have shortness of breath, nausea, vomiting, and back or jaw pain.

The most common symptom of a stroke is sudden weakness of the face, arm, or leg, most often on one side of the body. Other symptoms include sudden onset of:

- Numbness of the face, arm, or leg, especially on one side of the body;
- Confusion, difficulty speaking or understanding speech;
- Difficulty seeing with one or both eyes;
- Difficulty walking, dizziness, loss of balance or coordination;
- Severe headache with no known cause; and
- Fainting or unconsciousness.

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- People experiencing these symptoms should seek medical care immediately.

Rheumatic Heart Disease

Rheumatic heart disease is caused by damage to the heart valves and heart muscle from the inflammation and scarring caused by rheumatic fever. Rheumatic fever is caused by an abnormal response of the body to infection with streptococcal bacteria, which usually begins as a sore throat or tonsillitis in children.

Rheumatic fever mostly affects children in developing countries, especially where poverty is widespread. Globally, about 2% of deaths from cardiovascular diseases are related to rheumatic heart disease.

Symptoms of rheumatic heart disease

Symptoms of rheumatic heart disease include: shortness of breath, fatigue, irregular heartbeats, chest pain and fainting.

Symptoms of rheumatic fever include: fever, pain and swelling of the joints, nausea, stomach cramps and vomiting.

Burden of cardiovascular diseases be reduced

"Best buys" or very cost effective interventions that are feasible to be implemented even in low-resource settings have been identified by WHO for prevention and control of cardiovascular diseases. They include two types of interventions: population-wide and individual, which are recommended to be used in combination to reduce the greatest cardiovascular disease burden.

Examples of population-wide interventions that can be implemented to reduce CVDs include:

1. Comprehensive tobacco control policies
2. Taxation to reduce the intake of foods that are high in fat, sugar and salt
3. Building walking and cycle paths to increase physical activity
4. Strategies to reduce harmful use of alcohol
5. Providing healthy school meals to children.

At the individual level, for prevention of first heart attacks and strokes, individual health-care interventions need to be targeted to those at high total cardiovascular risk or those with single risk factor levels above traditional thresholds, such as hypertension and hypercholesterolemia. The former approach is more cost-effective than the latter and has the potential to substantially reduce cardiovascular events. This approach is feasible in primary care in low-resource settings, including by non-physician health workers.

For secondary prevention of cardiovascular disease in those with established disease, including diabetes, treatments with the following medications are necessary:

1. Aspirin
2. Beta-blockers
3. Angiotensin-converting enzyme inhibitors
4. Statins.

The benefits of these interventions are largely independent, but when used together with smoking cessation, nearly 75% of recurrent vascular events may be prevented. Currently there are major gaps in the implementation of these interventions particularly at the primary health care level.

In addition costly surgical operations are sometimes required to treat CVDs. They include:

a. Coronary artery bypass
b. Balloon angioplasty (where a small balloon-like device is threaded through an artery to open the blockage)
c. Valve repair and replacement

5. Heart transplantation
6. Artificial heart operations

Medical devices are required to treat some CVDs. Such devices include pacemakers, prosthetic valves, and patches for closing holes in the heart.

Cancer

Cancer is a generic term for a large group of diseases that can affect any part of the body. Other terms used are malignant tumours and neoplasms. One defining feature of cancer is the rapid creation

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of abnormal cells that grow beyond their usual boundaries, and which can then invade adjoining parts of the body and spread to other organs, the latter process is referred to as metastasizing. Metastases are the major cause of death from cancer.

The problem

Cancer is a leading cause of death worldwide, accounting for 8.2 million deaths in 2012. The most common causes of cancer death are cancers of:

lung (1.59 million deaths), liver (745 000 deaths), stomach (723 000 deaths), colorectal (694 000 deaths), breast (521 000 deaths), oesophageal cancer (400 000 deaths) .

Causes for cancer

Cancer arises from one single cell. The transformation from a normal cell into a tumour cell is a multistage process, typically a progression from a pre-cancerous lesion to malignant tumours. These changes are the result of the interaction between a person's genetic factors and 3 categories of external agents, including:

1. Physical carcinogens, such as ultraviolet and ionizing radiation;
2. Chemical carcinogens, such as asbestos, components of tobacco smoke, aflatoxin (a food contaminant) and arsenic (a drinking water contaminant); and
3. Biological carcinogens, such as infections from certain viruses, bacteria or parasites.

Ageing is another fundamental factor for the development of cancer. The incidence of cancer rises dramatically with age, most likely due to a build-up of risks for specific cancers that increase with age.

Risk factors for cancers

Tobacco use, alcohol use, unhealthy diet and physical inactivity are the main cancer risk factors worldwide. Some chronic infections are risk factors for cancer and have major relevance in low- and middle-income countries.

Hepatitis B (HBV), hepatitis C virus (HCV) and some types of Human Papilloma Virus (HPV) increase the risk for liver and cervical cancer respectively. Infection with HIV substantially increases the risk of cancer such as cervical cancer.

Modifying and avoiding risk factors

More than 30% of cancer deaths could be prevented by modifying or avoiding key risk factors, including:

1. Tobacco use
2. Being overweight or obese
3. Unhealthy diet with low fruit and vegetable intake
4. Lack of physical activity
5. Alcohol use
6. Sexually transmitted HPV-infection
7. Infection by HBV
8. Ionizing and non-ionizing radiation
9. Urban air pollution
10. Indoor smoke from household use of solid fuels.

Tobacco use is the single most important risk factor for cancer causing about 20% of global cancer deaths and around 70% of global lung cancer deaths. In many low-income countries, up to 20% of cancer deaths are due to infection by HBV and HPV.

Prevention strategies

a. Increase avoidance of the risk factors listed above.
b. Vaccinate against human papilloma virus (HPV) and hepatitis B virus (HBV).
c. Control occupational hazards.
d. Reduce exposure to non-ionizing radiation by sunlight. (UV)
e. Reduce exposure to ionizing radiation (occupational or medical diagnostic imaging).

Epidemic Diseases (Amendment) Ordinance ACT, 2020

The Epidemic Diseases (Amendment) Ordinance, 2020 was promulgated on April 22, 2020. The Ordinance amends the Epidemic Diseases Act, 1897. The Act provides for the

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prevention of the spread of dangerous epidemic diseases. The Ordinance amends the Act to include protections for healthcare personnel combatting epidemic diseases and expands the powers of the central government to prevent the spread of such diseases. Key features of the Ordinance include:

Definitions: The Ordinance defines healthcare service personnel as a person who is at risk of contracting the epidemic disease while carrying out duties related to the epidemic. They include:

1. Public and clinical healthcare providers such as doctors and nurses
2. Any person empowered under the Act to take measures to prevent the outbreak of the disease, and
3. Other persons designated as such by the state government.

An 'act of violence' includes any of the following acts committed against a healthcare service personnel:

1. Harassment impacting living or working conditions,
2. Harm, injury, hurt, or danger to life,
3. Obstruction in discharge of his duties, and
4. Loss or damage to the property or documents of the healthcare service personnel.

Property is defined to include a: (i) clinical establishment, (ii) quarantine facility, (iii) mobile medical unit, and (iv) other property in which a healthcare service personnel has direct interest, in relation to the epidemic.

Powers of the central government: The Act specifies that the central government may regulate:

1. The inspection of any ship or vessel leaving or arriving at any port, and
2. The detention of any person intending to travel from the port, during an outbreak.

The Ordinance expands the powers of the central government to regulate the inspection of any bus, train, goods vehicle, ship, vessel, or aircraft leaving or arriving at any land port, port or aerodrome. Further, the central government may regulate the detention of any person intending to travel by these means.

Protection for healthcare personnel and damage to property: The Ordinance specifies that no person can:

1. Commit or abet the commission of an act of violence against a healthcare service personnel, or
2. Abet or cause damage or loss to any property during an epidemic.

Contravention of this provision is punishable with imprisonment between three months and five years, and a fine between Rs 50,000 and two lakh rupees. This offence may be compounded by the victim with the permission of the Court. If an act of violence against a healthcare service personnel causes grievous harm, the person committing the offence will be punishable with imprisonment between six months and seven years, and a fine between one lakh rupees and five lakh rupees. These offences are cognizable and non-bailable.

Compensation: Persons convicted of offences under the Ordinance will also be liable to pay a compensation to the healthcare service personnel whom they have hurt. Such compensation will be determined by the Court. In the case of damage or loss of property, the compensation payable to the victim will be twice the amount of the fair market value of the damaged or lost property, as determined by the Court. If the convicted person fails to pay the compensation, the amount will be recovered as an arrear of land revenue under the Revenue Recovery Act, 1890.

Investigation: Cases registered under the Ordinance will be investigated by a police officer not below the rank of Inspector. The investigation must be completed within 30 days from the date of registration of the First Information Report.

Trial: The inquiry or trial should be concluded within one year. If it is not concluded within this time period, the Judge must record the reasons for the delay and extend the time period. However, the time period may not be extended for more than six months at a time.

When prosecuting a person for causing grievous harm to a healthcare service personnel,

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the Court will presume that person is guilty of the offence, unless the contrary is proved.

MCQ on Prevalence, Incidence, Vaccine, Immunization

1. The following is true about prevalence and incidence:
   (a) Both are rates
   (b) Prevalence is a rate but incidence is not
   (c) Incidence is a rate but prevalence is not
   (d) Both are not rates
2. Prevalence is a:
   (a) Rate (b) Ratio
   (c) Proportion (d) Mean
3. Incidence of a disease in a population of 30,000 and 300 new cases is:
   (a) 0.1 per 1000 (b) 10 per 1000
   (c) 100 per 1000 (d) 1 per 1000
4. For calculation of incidence denominator is taken as:
   (a) Mid year population
   (b) Population at risk
   (c) Total number of cases
   (d) Total number of deaths
5. The area is declared free of epidemic
   (a) Till last secondary case recovers
   (b) No new case reported for the incubation period of disease since the last case
   (c) No new case reported for twice the incubation period of disease since the last case
   (d) No new case reported for six months since the last case
6. Which of the following is the initial-most step in investigation of an epidemic ?
   (a) Defining the population at risk
   (b) Confirmation of existence of an epidemic
   (c) Verification of diagnosis
   (d) Rapid search for all cases and their characteristics
7. In epidemic, 1st step is:
   (a) Verification of diagnosis (b) Isolation
   (c) Immunization (d) Notification
8. Strain used for BCG vaccine:
   (a) Edmonston Zagreb strain
   (b) Oka strain
   (c) 'Danish' 1331
   (d) RA 27/3strain
9. Most heat sensitive vaccine is:
   (a) BCG (b) Polio
   (c) Measles (d) DPT
10. All of the following are killed vaccines except:
    (a) Salk Polio (b) Japanese encephalitis
    (c) Rabies (d) Yellow fever
11. The efficiency of cold chain system for oral polio vaccine as monitored by Vaccine Vial Monitor (VVM) depends on :
    (a) Change in the colour of vaccine
    (b) Temperature indicator of the system
    (c) Viral potency test
    (d) Change in colour of monitor
12. Salk vaccine is a-
    (a) Live vaccine
    (b) Live attenuated vaccine
    (c) Killed vaccine
    (d) Toxoid
13. In one single visit, a 9-month-old, unimmunized child can be given the following vaccination:
    (a) Only BCG
    (b) BCG, DPT-1, OPV-1
    (c) DPT-1, OPV-1, Measles
    (d) BCG, DPT-1, OPV-1, Measles
14. Which of the following is a live vaccine?
    (a) Salk polio vaccine (b) Sabin polio vaccine
    (c) Hepatitis B vaccine (d) Rabies vaccine
15. Administration of which vaccine can result in paralysis in children?
    (a) Measles vaccine (b) Sabin polio vaccine
    (c) DT vaccine (d) DPT vaccine
16. Which of the following is called 'first immunization' of the baby?
    (a) Colostrum
    (b) Handing over the baby to mother
    (c) OPV (d) DPT+BCG

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Answers of MCQ on Prevalence, Incidence, Vaccine, Immunization

1. Ans. (c) Incidence is a rate but prevalence is not
2. Ans. (c) Proportion
3. Ans. (b) 10 per 1000
4. Ans. (b) Population at risk
5. Ans. (c) No new case reported for twice the incubation period of disease since the last case
6. Ans. (c) Verification of diagnosis
7. Ans. (a) Verification of diagnosis
8. Ans. (c) 'Danish' 1331
9. Ans. (b) Polio
10. Ans. (d) Yellow fever
11. Ans. (d) Change in colour of monitor
12. Ans. (c) Killed vaccine
13. Ans. (d) BCG, DPT-1, OPV-1, Measles
14. Ans. (b) Sabin polio vaccine
15. Ans. (b) Sabin polio vaccine
16. Ans. (a) Colostrum

MCQ on Chicken Pox

1. The infectivity of chickenpox lasts for:
   (a) Till the last scab falls off
   (b) 6 days after onset of rash
   (c) 3 days after onset of rash
   (d) Till the fever subsides
2. Chickenpox is characterised by all except:
   (a) Scabs are infective
   (b) Pleomorphic stages
   (c) Rashes symmetrical centripetal dew-drop like
   (d) Palms and soles not affected by rash
3. Smallpox eradication was successful due to all of the following reasons except:
   (a) Subclinical cases did not transmit the disease
   (b) A highly effective vaccine was available
   (c) Infection provided lifelong immunity
   (d) Cross-resistance existed with animal pox
4. All of the following are true about Varicella virus except:
   (a) 10-30% chances of occurrence
   (b) All stages of rash are seen at the same time
   (c) Secondary attack rate is 90%
   (d) Rash commonly seen in flexor area
5. WHO declared global eradication of Smallpox on:
   (a) 26th October 1977 (b) 5th July 1975
   (c) 17th May 1975 (d) 8th May 1980
6. Secondary attack rate of chickenpox is:
   (a) 60 (b) 50
   (c) 90 (d) 40
7. Chickenpox vaccine is:
   (a) Live vaccine (b) Killed vaccine
   (c) Conjugated vaccine (d) Toxoid vaccine
8. Chickenpox is infective
   (a) 2 days before and 2 days after rash appearance
   (b) 2 days before and 5 days after rash appearance
   (c) 4 days before and 4 days after rash appearance
   (d) 4 days before and 5 days after rash appearance
9. All are true about chickenpox except:
   (a) Crusts contain live virus
   (b) Centripetal in distribution
   (c) Pleomorphic rashes seen
   (d) Rapid progression from macule to vesicle

Answers of MCQ on Chicken Pox

1. Ans. (b) 6 days after onset of rash
2. Ans. (a) Scabs are infective
3. Ans. (d) Cross-resistance existed with animal pox
4. Ans. (a) 10-30% chances of occurrence
5. Ans. (d) 8th May 1980
6. Ans. (c) 90
7. Ans. (a) Live vaccine
8. Ans. (b) 2 days before and 5 days after rash appearance

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9. Ans. (a) Crusts contain live virus

MCQ on Measles

1. Which of the following is not true of Measles?
   a. High secondary attack rate
   b. Only one strain causes infection
   c. Not infectious in prodromal stage
   d. Infection confers lifelong immunity
2. Which of the following is the 'Least common' complication of measles?
   a. Diarrhea
   b. Pneumonia
   c. Otitis media
   d. SSPE
3. Which of the following statements is true about the epidemiological determinants of measles?
   a. Measles virus survives outside the human body for 5 days
   b. Carriers are important sources of infection
   c. Secondary attack rate is less than that of rubella
   d. Incidence of measles is more in males than females
4. True about measles is all except:
   a. Kopliks spots appear as rash disappears
   b. It is prevented by both active and passive immunization
   c. Otitis media and meningitis are the most common complications
   d. TB is aggravated in post measles
5. All are true regarding measles vaccine except:
   a. Freeze dried live attenuated vaccine
   b. Single intramuscular dose of 0.5 ml
   c. Is occasionally associated with TSS
   d. Contraindicated in pregnancy
6. Which of the following is the reservoir for measles?
   a. Man b. Soil
   c. Fomites d. Monkey
7. True about measles except :
   a. Koplik spot appears in Prodromal stage
   b. Fever stops after onset of Rash
   c. Vaccine given at 9 months
   d. It is not diagnosed when coryza and rhinitis is absent
8. Measles vaccination campaign between 9-14 years age for elimination is:
   a. Keep up b. Follow up
   c. Mop up d. Catch up
9. Koplik spots are seen in:
   a. Prodromal stage b. Incubation
   c. Eruptive d. Convalescent stage
10. Most serious complication of Measles is:
   a. Koplik spots b. Parotitis
   c. Meningoencephalitis d. Nephritis
11. Most common cause of death due to measles is
   a. Pneumonia
   b. Secondary bacterial infection
   c. Measles encephalitis
   d. Otitis media
12. Post-exposure Measles vaccine must be given within .... day(s) of exposure
   a. 1 day b. 3 days
   c. 7 days d. 10 days
13. Supplementary immunization service for measles immunization?
   a. Keep up with >95% immunized
   b. Catch up
   c. Follow up
   d. All of the above
14. To eradicate measles the percentage of infant populationto be vaccinated is at least ____%:
   a. 70 b. 80
   c. 85 d. 95
15. Measles vaccine is not given before:
   a. 9 months b. 12 months
   c. 15 months d. 18 months
16. For measles:]
   a. Incubation period is 10 days
   B. Infectious 4 days before the rash
   c. Koplik's spots are seen
   d. All

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17. In Measles, infective period is:
    a. 3 days before and 4 days after the appearance of rash
    b. 4 days before and 3 days after the appearance of rash
    c. 4 days before and 5 days after the appearance of rash
    d. 5 days before and 4 days after the appearance of rash
18. The incubation period of Measles is:
    a. 3 days b. 10 days
    c. 21 days d. 30 days
19. All are true about measles except:
    a. Both active and passive immunization are given simultaneously
    b. Flaring up of TB
    c. Most infectious during rashes
    d. Causes pneumonia and otitis media
20. A baby was given a dose measles vaccine at 6 months of age due to epidemic of measles/ malnutrition. Correct regarding giving subsequent dose will be:
    a. Give one more dose as soon as possible
    b. Give after 14-16 months with booster dose
    c. Give after 9 months age
    d. No dose required

Answers of MCQ on Measles

1. Ans. (c) Not infectious in prodromal stage
2. Ans. (d) SSPE
3. Ans. (c) Secondary attack rate is less than that of rubella
4. Ans. (a) Kopliks spots appear as rash disappears
5. Ans. (b) Single intramuscular dose of 0.5 ml
6. Ans. (a) Man
7. Ans. (d) It is not diagnosed when coryza and rhinitis is absent
8. Ans. (d) Catch up
9. Ans. (a) Prodromal stage
10. Ans. (c) Meningoencephalitis
11. Ans. (b) Secondary bacterial infection
12. Ans. (b) 3 days
13. Ans. (d) All of the above
14. Ans. (d) 95
15. Ans. (a) 9 months
16. Ans. (d) All
17. Ans. (c) 4 days before and 5 days after the appearance of rash
18. Ans. (b) 10 days
19. Ans. (a) Both active and passive immunization are given simultaneously
20. Ans. (c) Give after 9 months age

MCQ On Rubella, Mump, Influenza, Diptheria, Whooping Cough, Meningococcal Meningitis

Rubella

1. Recommended vaccination strategy for rubella is to vaccinate first and foremost:
   (a) Women 15-49yrs
   (b) Infants
   (c) Adolescent girls
   (d) Children 1-14yrs
2. Risk of the damage of fetus by maternal rubella is maximum if mother gets infected in
   (a) 6-12 weeks of pregnancy
   (b) 20-24 weeks of pregnancy
   (c) 24-28 weeks of pregnancy
   (d) 32-36 weeks of pregnancy
3. All of the following statements are true about Congenital Rubella except:
   (a) It is diagnosed when the infant has IgM antibodies at birth
   (b) It is diagnosed when IgG antibodies persist for more than 6 months
   (c) Most common congenital defects are deafness, cardiac malformations and cataract
   (d) Infection after 16 weeks of gestation results in major congenital defectcable Diseases
4. MMR vaccine is recommended at the age of:
   (a) 9-12 months (b) 15-18 months
   (c) 2-3 years (d) 10-19 years

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5. Rubella features include all except:
   (a) Tender lymphnodes in the neck
   (b) Congenital infection with cataract
   (c) Incubation period < 10 days
   (d) Caused by RNA virus

Mumps

6. M.C. complication of mumps in children is:
   (a) Pneumonia (b) Pancreatitis
   (c) Aseptic meningitis (d) Encephalitis
7. Incubation period of Mumps is:
   (a) 7 days (b) 10 days
   (c) 14 days (d) 18 days

Influenza

8. Which of the following is not true about influenza virus?
   (a) Influenza virus A is subject to frequent antigenic variations
   (b) Antigenic drift is a gradual antigenic change over a period of time
   (c) Antigenic shift is due to genetic recombination of virus
   (d) Major epidemics are due to antigenic drift
9. Newer Influenza vaccine include:
   (a) split - virus vaccine
   (b) neuraminidase
   (c) live attenuated vaccine
   (d) killed vaccine
   (e) Recombinant vaccine
10. True about epidemiology of influenza:
   (a) Asymptomatic seen rarely
   (b) Incubation period 10-12 hrs
   (c) Pandemic rare
   (d) All ages and sex equally affected
11. Which of the following is true about influenza:
   (a) Affects all ages and sexes
   (b) I. P 18 - 72 hrs
   (c) Pandemics rare
   (d) Asymptomatics rare
12. Which of the following lead to an outbreak of Influenza in China in 2013?
   (a) H1N1 (b) H3N2
   (c) H2N2 (d) H7N9
13. Incubation period of swine flu:
   (a) 1-3 days (b) 2-3 weeks
   (c) 10-15 days (d) 5 weeks
14. Pig in H1N1 influenza acts as:
   (a) Carrier (b) Amplifying host
   (c) Reservoir (d) Vector
15. Major reason for H5N1 not to become a global pandemic is
   (a) Route of transmission is not respiratory
   (b) Man to man transmission is rare
   (c) Does not cause serious disease among humans
   (d) Restricted to few countries only
16. All are used in treatment of Influenza B except:
   (a) Oseltamivir (b) Zanamivir
   (c) Premavir (d) Ribavirin

Diphtheria

17. True about Diphtheria are all except:
   (a) Carriers are more common sources of infection than cases
   (b) Incubation period is 2-6 days
   (c) 25 Lf of diphtheria toxoid are present per ml in DPT vaccine
   (d) Diphtheria is an endemic disease in India
18. Positive Schick test indicates:
   (a) Immunity to diphtheria
   (b) Susceptibility to diphtheria
   (c) Hypersensitivity to diphtheria
   (d) Infection with diphtheria
19. A herd immunity of over ..... % is considered necessary to prevent epidemic spread of diphtheria:
   (a) 50% (b) 55%
   (c) 60% (d) 70%
20. Management of non-immunized diphtheria contacts include all except:
   (a) Prophylactic penicillin
   (b) Single dose of toxoid

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(c) Daily throat examination
(d) Weekly throat swabs examinationle Diseases

21. Incubation period of Diphtheria and Salmonella is
(a) 1-2 days & 20-40 days
(b) 2-6 days & 7-21 days
(c) 2-6 days & 10-14 days
(d) 1-2 days & 10-14 days

22. Treatment of choice for diphtheria carriers is:
(a) Erythromycin (b) Tetracycline
(c) Penicillin (d) DPT

23. Schick test does not indicate:
(a) Immunity to diphtheria
(b) Susceptibility to diphtheria
(c) Hypersensitivity to diphtheria
(d) Carrier of diphtheria

24. Diphtheria carrier are diagnosed by:
(a) Throat culture (b) Gram's staining
(c) Albert's staining (d) Schick test

25. A Negative Schick test indicates:
(a) Immunity to diphtheria
(b) Susceptibility to diphtheria
(c) Immunity to pertusis
(d) Immunity to mumps

Whooping Cough

26. The usual incubation period for pertussis is:
(a) 7-14 days (b) 3-5 days
(c) 21-25 days (d) Less then 3 days

27. Which of the following statements is true regarding pertussis?
(a) Neurological complication rate of DPT is 1 in 50000
(b) Vaccine efficacy is more than 95%
(c) Erythromycin prevents spread of disease between children
(d) Leukocytosis correlates with the severity of cough

28. True regarding pertussis is all except:
(a) It is associated with an inspiratory whoop
(b) It is a droplet infection
(c) Parapertussis causes more severe disease then pertussis
(d) Pneumonia is most common complication

29. True about Pertussis is/are except:
(a) Incubation period is 7-14 days
(b) Main source of infection is chronic carriers
(c) Can affect any age
(d) Secondary attack rate in unimmunised persons is 90%

30. Treatment for pertussis contacts children for:
(a) Prophylactic antibiotic for 10 days
(b) Prophylactic antibiotic for 14 days
(c) Prophylactic antibiotic for 12 days
(d) Prophylactic antibiotic for 11 days

31. A child with pertussis should be isolated for:
(a) 1-2weeks (b) 2-4weeks
(c) 3-4weeks (d) 4-6weeks

32. About pertussis true is:
(a) Secondary attack rate 90%
(b) No cross immunity with parapertussis
(c) Most infectious during paroxysmal stage
(d) Affects only humans

33. The neurological complications of DPT are due to:
(a) Pertussis component b) Diphtheria
(c) Tetanus (d) All

Meningococcal Meningitis

34. True about meningococcal meningitis is:
(a) Causative agent is a gram -ve diplococci
(b) Cases are the most important source of infection
(c) Treatment with penicillin eradicates carrier state
(d) Vaccine can be given in pregnancy

35. The following statements about meningococcal meningitis are true, except:
(a) The source of infection is mainly clinical cases
(b) The disease is more common in dry and cold months of the year
(c) Chemoprophylaxis of close contacts of cases is recommended
(d) The vaccine is not effective in children below 2 years of age

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36. Xavier and Yogender stay in the same hostel of the same university. Xavier develops infection with Group B meningococcus. After a few days, Yogender develops infection due to Group C meningococcus. All the following are true statements except:
    (a) Educate students about meningococcal transmission and take preventive measures
    (b) Chemoprophylaxis against both Group B and Group C
    (c) Vaccine prophylaxis of contacts of Xavier
    (d) Vaccine prophylaxis of contacts of Yogender
37. Vaccine for meningococcal meningitis should be routinely given to:
    (a) Laboratory workers
    (b) Young adolescents
    (c) 4-8 years old children
    (d) Elderly population
38. Prophylaxis of meningococcal meningitis is:
    (a) Ciprofloxacin (b) Rifampicin
    (c) Penicillin (d) Gentamycin
39. WHO criteria for High endemicity for Meningococcal disease include:
    (a) 0.1% (b) 0.01%
    (c) 0.001% (d) 1.0%
40. Meningococcal vaccine available is:
    (a) ACW135Y (b) ABCW135
    (c) CYW135B (d) ABCY
41. MC serotype of Meningococcus causing Epidemics worldwide is
    (a) A (b) W-135
    (c) C (d) Y
42. With reference to meningococcal meningitis, which one of the following statements is not correct?
    (a) Fatality in untreated cases is 60%
    (b) Disease spreads mainly by droplet infection
    (c) Treatment of cases has no significant effect in epidemiological pattern of disease
    (d) Mass chemoprophylaxis causes immediate drop in incidence rate of cases

Answers of MCQ On Rubella, Mump, Influenza, Diptheria, Whooping Cough, Meningococcal Meningitis

1. Ans. (a) Women 15-49 yrs
2. Ans. (a) 6-12 weeks of pregnancy
3. Ans. (d) Infection after 16 weeks of gestation results in major congenital defects
4. Ans. (b) 15-18 months
5. Ans. (c) Incubation period < 10 days
6. Ans. (c) Aseptic meningitis
7. Ans. (d) 18 days
8. Ans. (d) Major epidemics are due to antigenic drift
9. Ans. (a) split - virus vaccine; (b) neuraminidase; (e) recombinant vaccine
10. Ans. (d) All ages and sex equally affected
11. Ans. (a) Affects all ages and sexes;
    (b) I.P. 18 - 72 hours
12. Ans. (d) H7N9
13. Ans. (a) 1-3 days and Non-communicable Diseases
14. Ans. Not of the Choices
15. Ans. (b) Man to man transmission is rare
16. Ans. (d) Ribavirin
17. Ans. (c) 25 Lf of diphtheria toxoid are present per ml in DPT vaccine
18. Ans. (b) Susceptibility to diphtheria
19. Ans. (d) 70%
20. Ans. (b) Single dose of toxoid;
21. Ans. (c) 2-6 days & 10-14 days
22. Ans. (a) Erythromycin
23. Ans. (d) Carrier of diphtheria
24. Ans. (a) Throat culture
25. Ans. (a) Immunity to diphtheria
26. Ans. (a) 7-14 days
27. Ans. (c) Erythromycin prevents spread of disease between children
28. Ans. (c) Parapertussis causes more severe disease then pertussis
29. Ans. (b) Main source of infection is chronic carriers

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30. Ans. (a) Prophylactic antibiotic for 10 days
31. Ans. (c) 3-4 weeks
32. Ans. (a) Secondary attack rate 90%
33. Ans. (a) Pertussis component and Non-communicable Diseases
34. Ans. (a) Causative agent is a gram -ve diplococci
35. Ans. (a) The source of infection is mainly clinical cases
36. Ans. (c) Vaccine prophylaxis of contacts of Xavier
37. Ans. (b) Young adolescents
38. Ans. (b) Rifampicin
39. Ans. (b) 0.01%
40. Ans. (a) ACW135Y
41. Ans. (a) A
42. Ans. (a) Fatality in untreated cases is 60%

MCQ ON Tuberculosis

1. All of the following are the targets of STOP TB STRATEGY partnership except:
   (a) Achieve a diagnosis rate > 70% and cure rate > 85% (by 2005)
   (b) Reduce prevalence to < 150 per 100,000 population per year (by 2010)a
   (c) Lower deaths to < 1 per 100,000 population per year (by 2010)
   (d) Global incidence of TB disease < 1 case per million population per year
2. If the objective of the investigator is to assess the incidence of tuberculosis infection in a community, the most appropriate methodology would be to:
   (a) Identify all individuals with positive tuberculin test
   (b) Perform sputum examination of chest symptomatics
   (c) Identify new converters to Tuberculin test
   (d) Screen all under-five children with Tuberculin testand Non-communicaDiseases
3. Point of control in tuberculosis the infection is:
   (a) < 1% in 0-14 group of children
   (b) > 1% is all children 0-5 yrs age group
   (c) < 1% in 15-49 of age group
   (d) < 2% in 0-14 group
4. Which of the following is true about tuberculin test?
   (a) It gives the immune status of patient
   (b) It may be negative in dissociated tuberculosis
   (c) It tells about prior exposure to Mycobacterium tuberculosis only
   (d) It is highly positive in a post measles case
5. The most appropriate test to assess the prevalence of tuberculosis infection in a community is:
   (a) Mass Miniature Radiography
   (b) Sputum examination
   (c) Tuberculin test
   (d) Clinical examination
6. National Tuberculosis Institute is located at:
   (a) New Delhi (b) Chingelput
   (c) Bangalore (d) Chennai
7. Decrease in which of the following parameters indicate the decrease in tuberculosis problem in India?
   (a) Incidence of infection
   (b) Prevalence of infection
   (c) Incidence of disease
   (d) Prevalence of disease
8. The overall prevalence of tuberculosis infection in India as per 4th round of longitudinal survey was:
   (a) 20% (b) 30%
   (c) 40% (d) 50%
9. The percentage of positive Mantoux test in Indian if 20-40 yrs age group is:
   (a) < 5% (b) 5 - 10%
   (c) 20 - 30% (d) > 50%
10. Which of the following is not false about annual risk of TB?
    (a) ARI of 1% = 75 new cases
    (b) Current ARI in India is 1.7%

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(c) It represents new cases of T.B.
(d) It is assessed by tuberculin conversion in previously non-vaccinated children

11. McKneown's Theory states that reduced prevalence of Tuberculosis occurs due to:
(a) Enhanced knowledge and awareness
(b) Medical advancements
(c) Behavioural modification
(d) Social and environmental factors

12. Antitubercular drug which causes Optic neuritis is:
(a) Ethambutol (b) Rifampicin
(c) Isoniazid (d) Pyrizinamide

13. One TB infected person can infect how many people in 1 year?
(a) 20 (b) 30
(c) 10 (d) 5

14. Incidence of TB in a community measured by:
(a) Sputum smear + (b) Tuberculin test +
(c) Sputum culture (d) Mantoux test +

15. The most appropriate test to assess the prevalence of tuberculosis infection in a community is:
(a) Mass miniature radiography
(b) Sputum examination
(c) Tuberculin test
(d) Clinical examination

16. Mycobacterium tuberculosis infection in humans is most common because of:
(a) Contact (b) Inhalation
(c) Infiltration (d) Inoculation

17. One of the following is known as Tuberculin Conversion Index:
(a) Incidence of infection
(b) Prevalence of infection
(c) Incidence of disease
(d) Prevalence of diseaseCommunicable and Non-communicable Diseases

18. TB multidrug regimen is given to:
(a) Prevent resistance (b) Broad spectrum
(c) Prevent side effects (d) None

19. Sputum positive TB is:
(a) 1 out of 2 sputum sample +ve
(b) 2 out of 3 sputum sample +ve
(c) BACTEC +ve
(d) Mantoux test positive

20. Tuberculin positive means:
(a) Immunodeficient patient
(b) Resistance to tuberculin protein
(c) Patient is infected with mycobacterium
(d) Patient is suffering from disease

21. Sputum positive TB patients on chemotherapy should be isolated at least for
(a) 2 weeks (b) 3 weeks
(c) 4 weeks (d) 6 weeks

22. Contacts of Sputum positive tuberculosis patient who should be given preventive chemotherapy
(a) Pregnant women
(b) Old people
(c) Children above 6 years
(d) Children below 6 years

23. Tuberculin test is a cheap and easily available test. In which of the following situations there is high failure in interpretation of result?
(a) Environmental mycobacterium infections are less
(b) High prevalence of immunized people
(c) High prevalence of disease
(d) Lesser number of HIV positive cases

24. What is true about TB in a diabetic?
(a) Severity of TB increases
(b) Incidence of TB increases
(c) Course of TB disease changes
(d) All of the above

25. WHO defines Multi-drug resistant (MDR) Tuberculosis strain as one that is
(a) At least resistant to INH
(b) At least resistant to Rifampicin
(c) Resistant to INH and Rifampicin with or without resistant to other anti TB drugs
(d) Resistant to Streptomycin only

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26. TB Research Centre is located at
(a) Chennai (b) New Delhi
(c) Bangalore (d) Ahmedabad

27. According to WHO Guidelines, Latent TB investigation is not done in
(a) Patient on TNF inhibitors
(b) Silicosis
(c) Chronic alcoholism
(d) Dialysis

28. Tuberculin unit is:
(a) 0.0001 mg (b) 1 unit of PPD RT3
(c) 0.1 mg BCG (d) None of the above

29. By WHO best criteria for TB diagnosis is:
(a) Sputum + ve (b) Chest pain
(c) Cough - 3 weeks (d) X-ray finding

30. True about tuberculosis:
(a) >104 bacilli are required in sputum for detection
(b) Mantoux test can differentiate between BCG and infection
(c) Can be grown on ordinary culture media
(d) Drug sensitivity is tested by schick test

31. In tuberculosis combination of Antimicrobials is used:
(a) To delay the development of resistance
(b) To reduce toxicity
(c) To Broaden anti-bacterial spectrum
(d) To prevent Liberation of toxins from organisms

32. Number of sputum positive cases of tuberculosis per lakh in India is:
(a) 75 (b) 50
(c) 40 (d) 10

33. BCG is:
(a) Live attenuated vaccine
(b) Killed vaccine
(c) Toxoid
(d) Immunosuppressant agent

34. 1 mL of expectoration contains what minimum number of TB bacilli in an active case of TB?
(a) 100 (b) 1,000
(c) 10,000 (d) 1,00,000

35. In India, a tubercular mother is advised for all except:
(a) Give baby BCG
(b) ATT to mother
(c) With hold Breastfeeding
(d) None of these

Answers of MCQ ON Tuberculosis

1. 78. Ans. (c) Lower deaths to < 1 per 100,000 population per year (by 2010)
2. Ans. (c) Identify new converters to Tuberculin test
3. Ans. (a) <1% in 0-14 group of children
4. Ans. (b) It may be negative in dissociated tuberculosis
5. Ans. (c) Tuberculin test Communicable and Non-communicable Diseases
6. Ans. (c) Bangalore
7. Ans. (a) Incidence of infection
8. Ans. (c) 40%
9. Ans. (c) 20 - 30%
10. Ans. (d) It is assessed by tuberculin conversion in previously non-vaccinated children
11. Ans. (d) Social and environmental factors
12. Ans. (a) Ethambutol
13. Ans. (c) 10
14. Ans. (a) Sputum smear positive (+)
15. Ans. (c) Tuberculin test
16. Ans. (b) Inhalation
17. Ans. (a) Incidence of infection
18. Ans. (a) Prevent resistance
19. Ans. (a) 1 out of 2 sputum sample +ve
20. Ans. (c) Patient is infected with mycobacterium
21. Ans. (b) 3 weeks
22. Ans. (d) Children below 6 years
23. Ans. (b) High prevalence of immunized people
24. Ans. (d) All of the above
25. Ans. (c) Resistant to INH and Rifampicin with or without resistant to other anti TB drugs
26. Ans. (a) Chennai
27. Ans. (c) Chronic alcoholism

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28. Ans. (b) 1 unit of PPD RT3
29. Ans. (a) Sputum + ve
30. Ans. (a) >104 bacilli are required in sputum for detection
31. Ans. (a) To delay the development of resistance
32. Ans. (a) 75
33. Ans. (a) Live attenuated vaccine
34. Ans. (c) 10,000
35. Ans. (c) With hold breast feeding

MCQ on Poliomyelitis

1. Which type of sample can be used to isolate poliovirus earliest?
   (a) Stoo (b) Blood
   (c) Throat (b) CSF
2. True about complete eradication of poliomyelitis from India is:
   (a) From 2012 onwards, no vaccine associated polio case has been detected
   (b) Last polio case in India was reported in 13 January 2011
   (c) Mostly IPV is used currently
   (d) India is the only country which is not able to eliminate it completely
3. Regarding poliovirus responsible for poliomyelitis all are true except:
   (a) Type 3 is most common is India
   (b) Type 1 is most common in India
   (c) Type 1 is responsible for most epidemics
   (d) Type 2 is eradicated worldwide
4. For every clinical case of poliomyelitis subclinical cases are:
   (a) 500 in children and 75 in adults
   (b) 500 in children and 25 in adults
   (c) 250 in children and 25 in adults
   (d) 1000 in children and 75 in adults
5. Which of the following is not a type of Vaccine derived polio virus?
   (a) cVDPV (b) iVDPV
   (c) aVDPV (d) mVDPV
6. Polio virus is shed maximum in stool up to
   (a) 6 weeks (b) 8 weeks
   (c) 10 weeks (d) 12 weeks
7. Wild poliomyelitis is still endemic in
   (a) Sri Lanka (b) Pakistan
   (c) India (d) Nigeria
8. Incubation period of Vaccine associated paralytic poliomyelitis is
   (a) 1-2 hours (b) 1-3 days
   (c) 7-10 years (d) 4-30 days
9. Which of the following serotypes of Polio virus is most commonly associated with vaccine associated paralytic poliomyelitis?
   (a) Serotype 1 (b) Serotype 2
   (c) Serotype 3 (d) Serotype 1 and 2
10. Which of the following is least suggestive of poliovirus infection?
    (a) Low grade fever and malaise with complete resolution in 2 to 3 days
    (b) Biphasic illness with several days of fever, then meningeal symptoms and asymmetric flaccid paralysis 5 to 10 days later
    (c) Descending motor paralysis with preservation of tendon reflexes and absent sensation
    (d) Failure to isolate a virus from the CSF in the presence of marked meningismus
11. Polio is due to:
    (a) Virus (b) Bacteria
    (c) Protozoa (d) Fungus
12. Mg++ is used in OPV vaccine as:
    (a) Stabilizer (b) Adjuvant
    (c) Preservative (d) Vehicle
13. Killed Vaccine of polio is:
    (a) Salk (b) Sabin
    (c) Both (d) None
14. Wrong about polio patient who had paralysis:
    (a) Most predominant polio virus during epidemic is type I
    (b) Sub clinical infection common
    (c) Can transmit It by nasal discharge
    (d) Can be given vaccine
15. All are true about SALK vaccine except:
    (a) It prevents paralysis
    (b) Oral polio can be given as booster

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(c) It is contraindicated in immunocompromised patients
(d) Easily transported

Answers of MCQ On Poliomyelitis

1. Ans. (a) Stool
2. Ans. (b) Last polio case in India was reported in 13 January 2011
3. Ans. (a) Type 3 is most common is India
4. Ans. (d) 1000 in children and 75 in adults
5. Ans. (d) mVDPV
6. Ans. (d) 12 weeks
7. Ans. (b) Pakistan
8. Ans (a) 4-30 days
9. Ans. (c) Serotype 3
10. Ans. (c) Descending motor paralysis with preservation of tendon reflexes and absent sensation
11. Ans. (a) Virus
12. Ans. (a) Stabilizer
13. Ans. (a) Salk
14. Ans. (c) Can transmit it by nasal discharge
15. Ans. (c) It is contraindicated in immunocompromised patients

MCQ on Hepatitis

1. Which of the following is not transmitted through sexual route?
   (a) Hepatitis A
   (b) Hepatitis E
   (c) Both Hepatitis A and Hepatitis E
   (d) Hepatitis D
2. Marker for infectivity of serum in Hepatitis B is:
   (a) HBsAg (b) Anti HBc
   (c) HBe Ag (d) Anti HBc
3. Which of the Hepatitis B Virus serological marker indicates the first evidence of Hepatitis B infection?
   (a) Anti-HBs (b) Anti-HBc
   (c) HBeAg (d) HBsAgeases
4. Hepatitis A true is:
   (a) Causes mild illness in children
   (b) 3% incidence of carrier state
   (c) Sexual route common
   (d) 10% transform into HCC
   (e) Vertical Transmission never seen
5. Both HBsAg and HBeAg are positive in:
   (a) Acute infectious Hepatitis B
   (b) Chronic Hepatitis B
   (c) Recovery phase of Hepatitis B
   (d) Individuals vaccinated with Hepatitis B
6. 1955 Hepatitis outbreak is Delhi was:
   (a) A (b) B
   (c) C (d) E
7. Isolation period of Hepatitis A:
   (a) 1 weeks (b) 2 weeks
   (c) 3 weeks (d) 4 weeks
8. Most important in diagnosing Acute Hepatitis B is
   (a) IgG Anti-HBc (b) IgM Anti-HBc
   (c) Anti HBs (d) HBsAg
9. A nurse was diagnosed to have HBeAg and HBsAg in serum. Most likely she is having
   (a) Chronic hepatitis B
   (b) HBV + HBE coinfection
   (c) Active and infectious Hepatitis B disease
   (d) Recovery from Hepatitis B
10. Seen in Superinfection of HDV is
    (a) IgM Anti-HBc, IgM Anti-HDV
    (b) IgM Anti-HBs, HDVAg, IgM Anti-HDV, HDV RNA
    (c) IgM Anti-HBc, HDVAg, IgM Anti-HDV, HDV RNA
    (d) HDVAg, IgM Anti-HDV, HDV RNA
11. Which of the following viral markers signifies the ongoing viral replication in the case of Hepatitis-B infection?
    (a) Anti-HBs (b) Anti-HBc
    (c) HBe Ag (d) HBs Ag
12. Hepatitis A virus shedding in faeces is:
    (a) One week before the symptoms appear
    (b) Two weeks after the symptoms appear

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(c) Two weeks before the symptoms and two week thereafter
(d) One week before the symptoms and one week thereafter

13. Epidemiological marker of Hepatitis-B is:
(a) HBs Ag (b) Anti - HBs
(c) Anti HBc (d) HBe Ag

14. Chances of Viral Hepatitis Type C becoming a chronic infection are:
(a) 10% (b) 20%
(c) 30% (d) 50% or more

Answers of MCQ on Hepatitis

1. Ans. (b) Hepatitis E
2. Ans. (c) HBeAg
3. Ans. (d) HBsAg
4. Ans. (a) Cause mild illness in children
5. Ans. (a) Acute infectious Hepatitis B
6. Ans. (d) E
7. Ans. (c) 3 weeks
8. Ans. (b) IgM Anti-HBc
9. Ans. (c) Active and infectious Hepatitis B disease
10. Ans. (d) HDVAg, IgM Anti-HDV, HDV RNA
11. Ans. (c) HBe Ag
12. Ans. (c) Two weeks before the symptoms and two week thereafter
13. Ans. (a) HBs Ag
14. Ans. (d) 50% or more

MCQ On Diarrheal Diseases (Cholera and Typhoid)

1. The freshly prepared ORS (Oral Rehydration Solution) should not be used after:
(a) 6 hours (b) 12 hours
(c) 18 hours (d) 24 hours

2. A 5-year-old boy passed 18 loose stools in last 24 hours and vomited twice in last 4 hours. He is irritable but drinking fluids. The optimal therapy for this child is:
(a) Intravenous fluids
(b) Oral rehydration therapy
(c) Intravenous fluid initially for 4 hours followed by oral fluids
(d) Plain water add libitum

3. The best approach to prevent cholera epidemic in a community is:
(a) Mass chemoprophylaxis with tetracycline
(b) Vaccination of all individuals
(c) Health education
(d) Safe water and sanitation

4. Which of the following is the drug of choice for chemoprophylaxis of cholera?
(a) Tetracycline (b) Doxycycline
(c) Furazolidone (d) Co-trimoxazole

5. The usual incubation period for typhoid fever is:
(a) 10-14 days (b) 3-5 days
(c) 21-25 days (d) Less then 3 days

6. True about citrate in ORS:
(a) Increases shelf life (b) Nutritious
(c) Cheaper (d) Tastier

7. The sodium content of ReSoMal (rehydration solution for malnourished children) is:
(a) 90 mmol/L (b) 60 mmol/L
(c) 45 mmol/L (d) 30 mmol/L

8. Which one of the following gives strong evidence of Typhoid Fever carrier status:
(a) Isolation of Core antigen
(b) Isolation of Vi antigen
(c) Persistence of Vi antibodies
(d) Demonstration of Typhoid bacilli in stools

9. For controlling an outbreak of cholera, all of the following measures are recommended except:
(a) Mass chemoprophylaxis
(b) Proper disposal of excreta
(c) Chlorination of water
(d) Early detection and management of cases

10. Antibiotic treatment of choice for treating cholera in an adult is a single dose of:
(a) Tetracycline (b) Co-trimoxazole
(c) Doxycycline (d) Furazolidone

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11. A convalescent case of cholera remains infective for:
(a) < 7 days (b) 7-14 days
(c) 14-21 days (d) 21-28 days

12. A 12 kg child with diarrhoea, fluid to be replaced in first 4 hours:
(a) 0-400 ml (b) 400-800 ml
(c) 800-1200 ml (d) 1200-1600 ml

13. Which is true of typhoid?
(a) Female carriers are less common
(b) Male carriers though less are more dangerous
(c) Gall bladder usually not involved in carrier state
(d) Tetracycline is the DOC for carriers

14. Persistent diarrhoea in infants:
(a) 7 days (b) 14 days
(c) 21 days (d) 1 month

15. ORS should be discarded after:
(a) 54 hours (b) 6 hours
(c) 12 hours (d) 24 hours

16. Dehydration in a child with diarrhoea, thirst present, tears absent is:
(a) Mild (b) Moderate
(c) Severe (d) None

17. Concentration of sodium in mMol/L in low osmolar ORS is?
(a) 45 (b) 75
(c) 90 (d) 60

18. New WHO ORS osmolarity is:
(a) 270 (b) 245
(c) 290 (d) 310

19. ORS amount required in first 4 hours in a 1-year-old case of dehydration is:
(a) 200-400 ml (b) 400-600 ml
(c) 600-800 ml (d) 800-1200 ml

20. Which of the following about the composition of new ORS is wrong:
(a) NaCl- 2.6 grams/litre
(b) KC1- 1.5 grams/litre
(c) Glucose - 13.5 grams/litre
(d) Total osmolarity - 300mmol/l

21. True of 8th Pandemic of Cholera except
(a) Started in Bangladesh
(b) Due to O139 El Tor
(c) Low attack rate
(d) Low proportion of adults in endemic regions

22. A village affected with epidemic of cholera, what is the 1st step which should to be taken in village to decrease the death from cholera
(a) Safe water supply and sanitation
(b) Cholera vaccination to all individuals
(c) Primary Chemoprophylaxis
(d) Treat everyone in the village' with tetracyclineand Non-communicDiseases

23. Ratio of Sodium : Glucose in WHO Reduced Osmolarity ORS is
(a) 1:4 (b) 1:3
(c) 1:2 (d) 1:1

24. Mechanism of action of Cholera toxin is through
(a) Gangliosides
(b) Adenyl cyclase
(c) Gangliosides + Adenyl cyclase
(d) Exotoxin

25. Chemoprophylaxis is indicated in the following conditions except
(a) Cholera
(b) Meningococcal meningitis
(c) Plague (d) Typhoid

26. Drug of choice for carriers of typhoid is:
(a) Ampicillin (b) Chloramphenicol
(c) Co-trimoxazole (d) Clindamycin

27. Which is true of typhoid?
(a) Female carriers are less common
(b) Male carriers though less are more dangerous
(c) Gallbladder usually not involved in carrier state
(d) Tetracycline is the DOC for carriers

28. Typhoid oral vaccine is given:
(a) 1, 3, 5 days (b) 1, 2, 3 days
(c) 1, 2, 4 days (d) 1, 7, 14 days

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29. Isolation in patient with Salmonellosis is done:
    (a) Till fever subsides
    (b) Till Widal becomes negative
    (c) Till 3 stool test are negative
    (d) For 48 hrs of Chloramphenicol treatment
30. Best disinfectant for cholera stools is:
    (a) Bleaching powder (b) Cresol
    (c) Coal-tar (d) Formalin
31. In oral rehydration solution least amount in of:
    (a) Sodium citrate
    (b) Potassium chloride
    (c) Sodium chloride
    (d) Glucose

MCQ On Diarrheal Diseases (Cholera and Typhoid)

1. 151. Ans. (d) 24 hours
2. 152. Ans. (b) Oral rehydration therapy
3. Ans. (d) Safe water and sanitation
4. Ans. (a) Tetracycline
5. Ans. (a) 10-14 days
6. Ans. (a) Increases shelf life
7. Ans. (c) 45 mmol/L
8. Ans. (b) Isolation of Vi antigen
9. Ans. (a) Mass chemoprophylaxis
10. Ans. (c) Doxycycline
11. Ans. (c) 14-21 days
12. Ans. (c) 800-1200 ml
13. Ans. (b) Male carriers though less are more dangerous
14. Ans. (b) 14 days
15. Ans. (d) 24 hours
16. Ans. (b) Moderate
17. Ans. (b) 75
18. Ans. (b) 245
19. Ans. (c) 600-800 ml
20. Ans. (d) Total osmolarity - 300 mmol/l
21. Ans. (a) Started in Bangladesh;
22. Ans. (a) Safe water supply and sanitation
23. Ans. (d) 1:1
24. Ans. (c) Gangliosides + Adenyl cyclase
25. Ans. (d) Typhoid
26. Ans. (a) Ampicillin
27. Ans. (b) Male carriers though less are more dangerous
28. Ans. (a) 1, 3, 5 days
29. Ans. (c) Till 3 stool test are negative
30. Ans. (b) Cresol
31. Ans. (b) Potassium chloride

MCQ On Worm Infestations

1. All of the following statements regarding dracunculiasis are true except:
    (a) India has eliminated this disease
    (b) Niridazole prevents transmission of the disease
    (c) The disease is limited to tropical and subtropical regions
    (d) No animal reservoir has been proved
2. Chandlers Index is used in epidemiological studies of
    (a) Round worms (b) Hookworms
    (c) Guinea worms (d) Sand fly
3. Intermediate host for Hydatid disease is:
    (a) Man (b) Dog
    (c) Cat (d) Fox
4. Chandlers index for Hookworm. When it is health problem?
    (a) >300 (b) >200
    (c) >100 (d) >50
5. Chandler's index is used for:
    (a) Ankylostoma duodenale
    (b) Ascaris lumbricoides
    (c) Strongyloides
    (d) Trichuris trichiura
6. Uses of Chandler's index for hookworm include all except:
    (a) Assessment of endemicity
    (b) Monitoring individual treatment
    (c) Monitoring mass treatment of community
    (d) Comparison of worm load in different populations

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7. WHO considerations regarding Dracunculosis eradication, all are true except:
   (a) Drinking piped water and installation of hand pumps
   (b) DDT
   (c) Health education and awareness of public
   (d) Control of Cyclops
8. Guinea worm infestation is common in workers of:
   (a) Step wells (b) Ponds
   (c) Fields (d) Cotton mills
9. According to Chandler's index water containing 200-250 eggs should be considered as:
   (a) Safe (b) Mild pollution
   (c) Dangerous (d) Public health problem
10. Dracunculiasis was more common in which of the following state?
   (a) Orissa (b) Rajasthan
   (c) Tamil Nadu
   (d) U.P.Communicable nd
11. Cysticercosis cellulosae causes infection with:
   (a) Taenia saginata
   (b) Taenia solium
   (c) Echinococcus granulosus
   (d) Diphyllobothrium latum
12. Chandler's index is:
   (a) No. of eggs of hook work in 100 gram soil
   (b) No. of eggs of hookworm in per gram soil
   (c) No. of eggs of hookworm in per gram stool
   (d) Percentage of stool specimens positive for hookworms

Answers of MCQ On Worm Infestations

1. Ans. (b) Niridazole prevents transmission of the disease
2. Ans. (b) Hookworms
3. Ans. (a) Man
4. Ans. (a) >300
5. Ans. (a) Ankylostoma duodenale
6. Ans. (b) Monitoring individual treatment
7. Ans. (b) DDT
8. Ans. (a) Step wells
9. Ans. (c) Dangerous
10. Ans. (b) Rajasthan
11. Ans. (b) Taenia solium
12. Ans. (c) No. of eggs of hookworm in per gram stool

MCQ On Leprosy

1. False about Leprosy is:
   (a) It has been eliminated from India
   (b) It can be transmitted through breast milk
   (c) Lepromin Test is not a diagnostic test
   (d) MDT is contraindicated during pregnancy
2. Leprosy is considered a public health problem if the prevalence of leprosy is more than:
   (a) 1 per 10,000 (b) 2 per 10,000
   (c) 5 per 10,000 (d) 10 per 10,000
3. In the management of leprosy, Lepromin test is most useful for:
   (a) Herd Immunity
   (b) Prognosis
   (c) Treatment
   (d) Epidemiological investigations
4. Which of the following statements about lepromin test is not true?
   (a) It is negative in most children in first 6 months of life
   (b) It is a diagnostic test
   (c) It is an important aid to classify type of leprosy disease
   (d) BCG vaccination may convert lepromin reaction from negative to positive
5. In the management of leprosy, Lepromin test is not useful for:
   (a) Diagnosis
   (b) Prognosis
   (c) Confirmation of classification
   (d) Evaluation of cell mediated immunity
6. All of the following statements about leprosy are true except:
   (a) Multibacillary leprosy is diagnosed when there are more than 5 skin patches

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(b) New case detection rate is an indicator for incidence of leprosy
(c) A defaulter is defined as a patient who has not taken treatment for 6 months or more
(d) The target for elimination of leprosy is to reduce the prevalence to less than 1 per 10,000 population

7. All of the following are tests used to detect Cell mediated immunity in Leprosy except:
(a) Lepromin Test
(b) Lymphocyte Transformation Test
(c) Leucocyte Migration Inhibition Test
(d) FLA-ABS Test

8. Erythema Nodosum Leprosum (ENL) occurs:
(a) Due to Lepromin test reaction
(b) In those with tuberculoid leprosy
(c) As a reaction to multi drug therapy
(d) In those with lepromatous leprosy

9. True about epidemiology of leprosy:
(a) If high prevalence of cases seen in childhood, it means disease is under control
(b) Lepra bacilli cannot survive outside human body
(c) Bacterial load is high in tuberculoid variety
(d) Insect can transmit the disease

10. Which of the following about lepromin test is not true?
(a) It is negative in most children in first six months
(b) It is a diagnostic test
(c) It is an important aid to classify type of leprosy disease
(d) BCG vaccination may convert lepra reaction from negative to positive

11. Elimination of leprosy is defined as prevalence:
(a) < 1 per 1000 (b) < 1 per 10000
(c) < 1 per 100,000 (d) < 1 per 100

12. Leprosy is not yet eradicated because:
(a) No effective vaccine
(b) Highly infectious but low pathogenicity
(c) Only humans are reservoir
(d) Long incubation period

13. As per WHO, leprosy is a public health problem if prevalence is more than:
(a) 0.1% (b) 0.01%
(c) 0.5% (d) 1%

14. Prevalence of leprosy in India per 10,000 is?
(a) >1 (b) 0.88
(c) 0.71 (d) 0.69

15. Generation time for leprosy bacillus is:
(a) 8-10 days (b) 10-12 days
(c) 12-15 days (d) 15-20 days

16. Erythema nodosum is seen in treatment of which type of leprosy?
(a) Borderline leprosy
(b) Lepromatous leprosy
(c) Tuberculoid leprosy
(d) None of the above

17. "Multibacillary" is a spectrum of disease, seen in:
(a) Leprosy (b) TB
(c) Tetanus (d) Trachoma

18. Lepromin test is used for all of the following except:
(a) Classify the lesions of leprosy patients
(b) Determine the prognosis of disease
(c) Assess the resistance of individuals to leprsoy
(d) Diagnosis of leprosy

19. Mistuda reaction is read at:
(a) 3rd day (b) 10th day
(c) 21th day (d) 45th day

20. Leprosy commonly spreads by:
(a) Milk (b) Droplet
(c) Water (d) Mosquitoes

21. In multibacillary leprosy, the follow up examination after adequate Rx should be done yearly for:
(a) 3 years (b) 5 years
(c) 10 years (d) 2 years

22. Most common nerve involved in leprosy:
(a) Ulnar N (b) Common peroneal N
(c) Median N (d) Radial N

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23. Treatment of leprosy a/c to WHO is done by all drugs, except:
(a) Dapsone (b) Clofazimine
(c) Ciprofloxacin (d) Rifampicin

24. Which of the following is true statement about leprosy:
(a) Two plus (2+) indicates 2 different site
(b) 7 sites are needed
(c) Paucibacillary leprosy bacterial index is less than 2
(d) Various sites needed

25. In paucibacillary leprosy the single drug dapsone is continue for:
(a) 9 days (b) 90 days
(c) 180 days (d) 10 days

26. Lepromin test is valuable for:
(a) Diagnosis of disease
(b) Prognosis of disease
(c) Response to treatment
(d) To test humoral immunity

27. In Leprosy 1+ bacterial index indicates:
(a) <100 baciHi per high power field
(b) No bacilli in 100 high power fields
(c) 1 or less than one bacillus in each hpf
(d) Bacilli in all fields

28. Only objective way of monitoring the benefits of treatment of leprosy is:
(a) Lepromin test (b) Morphology index
(c) Histamine test (d) Bacteriological index

29. Lepromin test is used for all the following except:
(a) It determines the type of leprosy
(b) It confirms diagnosis of leprosy
(c) It monitors leprosy patients is treatment with chemotherapy
(d) It evaluates host resistance to leprosy

30. Which of the following types of leprosy by Indian classification of Leprosy is not included in Madrid classification?
(a) Indeterminate leprosy
(b) Borderline type
(c) Tuberculoid leprosy
(d) Pure neuritic type

31. In multi-bacillary leprosy, bacterial index is more than:
(a) 1 (b) 2
(c) 5
(d) 10Communicable and Non-communicable Diseases

32. Which of the following measurements indicates whether leprosy cases are being detected early or not?
(a) New case detection rate
(b) Proportion of children among new cases
(c) Proportion of new cases with disability
(d) Prevalence rate of disease

33. Duration of MDT (Multidrug Therapy) to resolve paucibacillary leprosy is:
(a) 6 month (b) 8 month
(c) 9 month (d) 12 month

Answers of MCQ on Leprosy

1. Ans. (d) MDT is contraindicated during pregnancy
2. Ans. (a) 1 per 10,000
3. Ans. (b) Prognosis
4. Ans. (b) It is a diagnostic test
5. Ans. (a) Diagnosis
6. Ans. (c) A defaulter is defined as a patient who has not taken treatment for 6 months or more
7. Ans. (d) FLA-ABS Test
8. Ans. (d) In those with lepromatous leprosy
9. Ans. (d) Insect can transmit the disease
10. Ans. (b) It is a diagnostic test
11. Ans. (b) < 1 per 10000
12. Ans. (d) Long incubation period
13. Ans. (b) 0.01%
14. Ans. (d) 0.69
15. Ans. (c) 12-15 days
16. Ans. (b) Lepromatous leprosy
17. Ans. (a) Leprosy
18. Ans. (d) Diagnosis of leprosy
19. Ans. (c) 21st day
20. Ans. (b) Droplet

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21. Ans. (b) 5 years
22. Ans. (a) Ulnar N
23. Ans. (c) Ciprofloxacin
24. Ans. (c) Paucibacillary leprosy bacterial index is less than 2
25. Ans. (c) 180 days
26. Ans. (b) Prognosis of disease
27. Ans. (c) 1 or less than one bacillus in each hpf
28. Ans. (d) Bacteriological index
29. Ans. (b) It confirms diagnosis of leprosy
30. Ans. (d) Pure neuritic type
31. Ans. (b) 2
32. Ans. (d) Prevalence rate of disease
33. Ans. (a) 6 month

MCQ on HIV/AIDS

1. The commonest mode of transmission of AIDS in India (in descending order) is:
   (a) Transplacental, homosexual, heterosexual
   (b) Homosexual, heterosexual, transplacental
   (c) Heterosexual, transplacental, homosexual
   (d) Heterosexual, homosexual, transplacental
2. In which of the Indian states the maximum number of AIDS cases has been reported till now?
   (a) Delhi (b) Kerala
   (c) Tamil Nadu (d) Bihar
3. World AIDS day is on:
   (a) 1st May (b) 31st October
   (c) 1st December (d) 29th May
4. The first country in the South East Asian Region (SEAR) to report AIDS was:
   (a) Sri Lanka (b) India
   (c) Thailand (d) Bangladesh
5. The most common mode of HIV transmission in India is:
   (a) Blood transfusion
   (b) Mother to child transmission
   (c) Sexual transmission
   (d) Use of unsterile syringes and needles
6. The highest number of AIDS cases in India have occurred in the age group of:
   (a) 0-14 years (b) 15-29 years
   (c) 30-44 years (d) Above 45 years
7. WHO Stage IV HIV includes all except:
   (a) Toxoplasmosis
   (b) Pneumocystis carinii
   (c) HIV wasting syndrome
   (d) Oral thrush
8. Major signs for AIDS case definition according to WHO are except:
   (a) Generalised lymphadenopathy
   (b) Prolong fever more than 1 month
   (c) Prolong cough for > 1 month
   (d) Chronic diarhoea > 1 month
9. Which of the following is used to prevent transmission of HIV from an infected pregnant mother to newborn child?
   (a) Lamivudine (b) Nevirapine
   (c) Stavudine (d) Didanosine
10. Risk of mother to child HIV transmission in pregnant woman at the time of delivery, and after delivery in non-breast feeding woman is:
    (a) 5-10% (b) 10-15%
    (c) 15-30% (d) More than 50%
11. HIV post exposure prophylaxis should be started within:
    (a) 24 hours (b) 48 hours
    (c) 72 hours (d) 6 hours
12. Criteria included in AIDS Surveillance definition include except:
    (a) Extrapulmonary TB (b) Cryptococcosis
    (c) Candidiasis (d) Leptospirosis
13. HIV transmission Mother to child can be stopped by all except:
    (a) Caesarean section
    (b) Vitamin A supplementation
    (c) Stopping Breast feeding
    (d) Zidovudine to mother antenatal and newborn after delivery
14. MC subtype of HIV in India is:
    (a) HIV-A (b) HIV-B
    (c) HIV-C (d) None of the above

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15. HIV sentinel surveillance is used to identify/ calculate:
(a) High risk population
(b) Prevalence of HIV
(c) Trend finding among populations
(d) All of the above

16. Antiretroviral prophylaxis decrease the chance of transmission of HIV to fetus during pregnancy of HIV to fetus during pregnancy by
(a) 35% (b) 45%
(c) 50% (d) 65%

17. HIV virus was discovered in the year
(a) 1981 (b) 1983
(c) 1986 (d) 1996

18. Most effective to prevent HIV Vertical transmission
(a) HAART (b) Nevirapine
(c) Zidovudine (d) Elective CS

19. In a HIV infected child which vaccine should not be given:
(a) DPT (b) OPV
(c) Hepatitis B (d) Typhoid vaccine

20. About epidemiology of AIDS all are true except:
(a) In India it is mainly caused by HIV-1
(b) Maternofetal transmission is the most common mode of transmission
(c) I.V. drug abuse increases the risk
(d) Medical personnel are at higher risk of getting infection with HIV

21. First case of AIDS was reported in:
(a) 1984 (b) 1986
(c) 1981 (d) 1988

22. All the following statements art true for the viral genome in HIV, except:
(a) They are diploid
(b) They consist of DNA dependent DNA polymerase activity
(c) They consist of three major genes-gag, pol and envcharacteristic of all retroviruses
(d) They are most complex of human retroviruses

23. From epidemiological point of view of AIDS, which of the following states in India is put in Group I (i.e. general epidemiological cases of HIV > 5% high risk and HIV > 1% ANC)?
(a) Assam (b) Mizoram
(c) Nagaland (d) Tripura

24. Detailed plan titled "3 by 5" implemented by WHO in 2003 for AIDS means:
(a) Treating at least 3 to 5 AIDS infections
(b) Controlling 3 chances of infection out of known 5
(c) Providing treatment to 3 million sufferers by year 2005
(d) All of the above

25. Window period for HIV infection is:
(a) 3-12 weeks (b) 8-20 weeks
(c) 6-24 weeks (d) None

26. Most common mode of HIV transmission from mother to child:
(a) 1st trimester (b) 2nd transmission
(c) Perinatal (d) Breastfeeding

Answers of MCQ on HIV/AIDS

1. Ans. (c) Heterosexual, transplacental, homosexual
2. Ans. (c) Tamil Nadu
3. Ans. (c) 1st December
4. Ans. (c) Thailand
5. Ans. (c) Sexual transmission
6. Ans. (c) 30-44 years
7. Ans. (d) Oral thrush
8. Ans. (c) Prolong cough for > 1 month
9. Ans. (b) Nevirapine
10. Ans. (c) 15-30%
11. Ans. (c) 72 hours
12. Ans. (d) Leptospirosis
13. Ans. (b) Vitamin A supplementation
14. Ans. (c) HIV-C
15. Ans. (d) All of the above
16. Ans. (d) 65%
17. Ans. (b) 1983

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18. Ans. (a) HAART
19. Ans. (b) OPV
20. Ans. (b) Maternofetal transmission is the most common mode of transmission
21. Ans. (c) 1981
22. Ans. (b) They consist of DNA dependent DNA polymerase activity
23. Ans. (c) Nagaland
24. Ans. (c) Providing treatment to 3 million sufferers by year 2005
25. Ans. (a) 3-12 weeks
26. Ans. (c) Perinatal

MCQ on STDS

1. Lymphogranuloma venereum is caused by:
   (a) Haemophilus ducreyi
   (b) Calymmotabacterium granulomatis
   (c) Treponema pertenue
   (d) Chlamydia trachomatis
2. All the following are causative agents of sexually transmitted infections except:
   (a) Candida
   (b) Group B streptococcus
   (c) Hepatitis B
   (d) Echinococcus
3. Which of the following is not a STD agent?
   (a) Ureaplasma urealyticum
   (b) Gp. B Streptococcus
   (c) Candida albicans
   (d) Chlamydia psittaci
4. Match the treponemal disease and their causative agents:
   A-Pinta I-T. pertenue
   B- Endemic Syphilis II-T. carateum
   C-Yaws III-T. pallidum
   (a) A-I, B-II, C-III (b) A-II, B-I, C-III
   (c) A-II, B-III, C-I (d) A-I, B-III, C-II
5. The syndromic management of urethral discharge includes treatment of
   (a) Neisseria gonorrhoeae and herpes genitalis
   (b) Chalamydia trachomatis and herpes genitalis
   (c) Neisseria gonorrhoeae and Chlamydia trachomatis
   (d) Syphilis and chancroid
6. In India, syndromic approach is used for management of:
   (a) Chancroid and Chancre
   (b) Chancroid and Herpes genitalis
   (c) Chancroid, Chancre and Herpes genitalis
   (d) Chancre and Herpes genitalis
7. True about incubation periods of STDs except
   (a) Syphilis 10-90 days
   (b) LGV 3-10 days
   (c) Donovanosis 3-20 days
   (d) Chancroid 21-28 days
8. A sexually active, long distance truck driver's wife comes with vaginal discharge. Under Syndromic approach, which drug should be given?
   (a) Metronidazole, Azithromycin, Fluconazole
   (b) Metronidazole
   (c) Azithromycin
   (d) Metronidazole and fluconazole
9. Case detection in STDs is done by all except:
   (a) Screening (b) Contact tracing
   (c) Cluster testing (d) Notification
10. Drug of choice for Scabies in Pregnancy is
    (a) Ivermectin (b) Crotaminton
    (c) Benzyl benzoate (d) Permethrin
11. Cluster testing is useful in detecting cases of:
    (a) STD (b) Cancer
    (c) Diabetes (d) Measles
12. Scabies is caused by:
    (a) Trichophyton (b) Dermatophyten
    (c) Mycobacterium (d) Sarcoptes scabei
13. Incubation period of chancroid is:
    (a) Less than 7 days (b) 10-15 days
    (c) 2-3 weeks (d) 3-4 weeks
14. Incubation period of syphilis:
    (a) 9-90 days (b) 9-18 days
    (c) 80-90 days (d) 10 days

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15. Method of case detection in control of sexually transmitted diseases in which person names the persons moving in same socio-sexual environment?
(a) Contact tracing
(b) High risk screening
(c) Selective screening
(d) Cluster testing

Answers of MCq on STDS

1. Ans. (d) Chlamydia trachomatis
2. Ans. (d) Echinococcus
3. Ans. (d) Chlamydia psittaci
4. Ans. (c) A-II, B-III, C-I
5. Ans. (c) Neisseria gonorrhoeae and Chlamydia trachomatis
6. Ans. (c) Chancroid, Chancre and Herpes genitalis
7. Ans. (d) Chancroid 21-28 days
8. Ans. (a) Metronidazole, Azithromycin, Fluconazole
9. Ans. (d) Notification
10. Ans. (d) Permethrin
11. Ans. (a) STD
12. Ans. (d) Sarcoptes scabiei
13. Ans. (a) Less than 7 days
14. Ans. (a) 9-90 days
15. Ans. (d) Cluster testing

MCQ on Other Communicable Diseases

1. All of the following are zoonoses except:
(a) Plague
(b) Japanese emcephalitis
(c) HIV
(d) Tuberculosis
2. Which of the following statements about Yaws is not true?
(a) Spread by sexual transmission
(b) Caused by Treponema pertenue
(c) Has cross immunity with Syphilis
(d) Cannot be differentiated serologically from Treponema pallidum
3. Dhamendra's Index and Jopling's classification deals with:
(a) TB (b) Leprosy
(c) Syphilis (d) Polio
4. The following are characteristic features of staphylococcal food poisoning, except:
(a) Optimum temperature for toxin formation is 37°C
(b) Intra-dietetic toxins are responsible for intestinal symptoms
(c) Toxins can be destroyed by boiling for 30 minutes
(d) Incubation period is 1-6 hours
5. Iceberg phenomenon is not seen in:
(a) AIDS (b) TB
(c) Poliomyelitis (d) Measles
6. All of the following diseases can be transmitted during the incubation period except:
(a) Measles (b) Tuberculosis
(c) Hepatitis A (d) Pertussis
7. In all of the following diseases chronic carriers are found except:
(a) Measles (b) Typhoid
(c) Hepatitis B (d) Gonorrhea
8. Brucellosis can be transmitted by all of the following modes, except:
(a) Contact with infected placenta
(b) Ingestion of raw vegetables from infected farms
(c) Person to person transmission
(d) Inhalation of infected dust or aerosol
9. Which one of the following arboviral diseases has not been reported in India?
(a) Japanese encephalitis
(b) Yellow fever
(c) Chikungunya fever
(d) Kyasanur forest disease
10. In which of these conditions is post exposure prophylaxis NOT useful?
(a) Measles (b) Rabies
(c) Pertussis (d) Hepatitis B

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11. "Hundred day cough" is the name of:
(a) Cough due to Bordetella pertussis
(b) Cough due to haemophylus influenza
(c) Cough due to adenovirus
(d) Cough due to respiratory syncytial virus

12. Which one of the following diseases CANNOT be eradicated:
(a) Leprosy (b) Tuberculosis
(c) Measles (d) Pertussis

13. '3 by 5 Initiative' was launched in developing countries to combat:
(a) Tuberculosis (b) Malaria
(c) SARS (d) HIV/AIDS

14. Intermediate host for Taenia saginata is:
(a) Man (b) Cattle
(c) Pig (d) Fish

15. A synthetic "cocktail" vaccine SPf66 has shown potential for the protection against:
(a) Dengue/DHF
(b) Japanese encephalitis
(c) Falciparum Malaria
(d) Lymphatic filariasis

16. All of the following are blood-borne infections except:
(a) Hepatitis B (b) Hepatitis C
(c) Hepatitis E (d) Hepatitis G

17. WHO vaccination strategy of catch-up, keep-up and follow-up has been designed for:
(a) Measles (b) Chickenpox
(c) Polio (d) Diphtheria

18. Carriers are important in all the following except:
(a) Polio (b) Typhoid
(c) Measles (d) Diphtheria

19. Chandler's index is based on:
(a) Hookworm eggs in soil
(b) Hookworm eggs per gram faeces
(c) Giardia cysts in soil
(d) Ascaris larva in water

20. Man in the only host for:
(a) Trichuris trichura
(b) Dracunculus medinensis
(c) Onchocerca volvolus
(d) Wuchereria bancrofti

21. Which of the following is not administered by intradermal route?
(a) BCG (b) Insulin
(c) Mantoux
(d) Drug sensitivity injection

22. Cluster testing is the term used during:
(a) UIP Survey for polio
(b) Screening for STD's
(c) Exposing the body for hypopigmented patches
(d) Testing contacts of typhoid cases

23. Incubation period less than few hours:
(a) Hepatitis - A (b) Food poisoning
(c) Influenza (d) Rabies

24. Arboviral disease are:
(a) Yellow fever
(b) Epidemic typhus
(c) Kala-azar
(d) HIVNon-communicable Diseases

25. Epidemic caused by type A arbovirus in India is:
(a) Chikungunya (b) KFD
(c) Yellow Fever (d) Dengue

26. Karatomalacia is seen in which of the following diseases:
(a) Measles (b) Mumps
(c) Rubella (d) Chickenpox

27. Pandemics are caused by:
(a) Hepatitis-B (b) Influenza-A
(c) Influenza-B (d) Influenza-C

28. Animal to man transmission seen in:
(a) Rabies (b) HIV
(c) Mumps (d) Tetanus

29. Vector borne diseases are except:
(a) Epidemic typhus
(b) Japanese encephalitis
(c) Tetanus
(d) KFD

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30. Which of the following is not transmitted by lice?
(a) Trench fever (b) Relapsing fever
(c) Q fever (d) Epidemic typhus

31. False about Japanese Encephalitis is:
(a) Pigs are amplifiers for flavirirus
(b) Overhead tanks severe as breeding sites
(c) Transmitted by culex mosquitoes
(d) Primary doses of vaccine consists of two doses

32. Mass prophylaxis is given for all except:
(a) Lymphatic filariasis
(b) Vitamin A deficiency
(c) Scabies
(d) Worm infestation

33. Modes of transmission of amoebiasis are all except:
(a) Faecal-oral
(b) Oro-rectal
(c) Vertical transmission
(d) Through cockroaches

34. Arthropod borne disease not seen in India is:
(a) West Nile Fever
(b) Dengue infection
(c) Kyasanur Forest Disease
(d) Yellow Fever

35. Carrier state is not important in transmission of:
(a) Typhoid (b) Poliomyelitis
(c) Measles (d) Diphtheria

36. All are true about Yaws except:
(a) Caused by Treponema pertenue
(b) Transmitted non-venerally
(c) Secondary Yaws can involve bones
(d) Later stages involve heart and nerves

37. Tetracycline is used in the prophylaxis of:
(a) Cholera (b) Brucellosis
(c) Leptospirosis (d) Meningitis

38. Maternal antibodies do not occur for:
(a) Polio (b) Diphtheria
(c) Whooping cough (d) Tetanus

39. Which is not transmitted by Aedes aegypti?
(a) Yellow fever (b) Dengue
(c) Japanese encephalitis (d) Filariasis

40. Maternal antibodies are present in the newborn against all of the following disease except:
(a) Diphtheria (b) Tetanus
(c) Pertussis (d) Measles

41. Mass prophylaxis not done in:
(a) Scabies
(b) Lymphatic filariasis
(c) Vitamin A deficiency
(d) Worm infestation

42. Rat is associated with:
(a) Leptospirosis (b) Measles
(c) Tetanus (d) Influenza

43. Incubation period of which disease is less than 7 days:
(a) Cholera (b) Measles
(c) Leishmaniasis (d) Mumps

44. Dome shaped centrally umbilicated papules seen in:
(a) Chickenpox (b) Smallpox
(c) Measles
(d) Molluscum contagiosum

45. Which of the following is a zoonotic disease?
(a) Hydatid cyst (b) Malaria
(c) Filariasis (d) Dengue fever

46. Subclinical infection is seen in all except:
(a) Mumps (b) Poliomyelitis
(c) Measles (d) Rubella

47. Second attack rate is minimum in:
(a) TB (b) Diphtheria
(c) Measles (d) Whooping cough

48. Post-exposure prophylaxis exist for all except:
(a) Measles (b) Hepatitis C
(c) Varicella Zoster (d) HIV

49. Zoonotic disease of viral etiology include:
(a) Q fever (b) Rickettsiae disease
(c) Rabies (d) Rubella

50. Prophylaxis for anthrax:
(a) Erythromycin (b) Doxycycline
(c) Penicillin (d) Vancomycin

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51. Isolation period, false is:
(a) Chickenpox - 6 days after onset of rash
(b) Herpes zoster - 6 days after onset of rash
(c) Measles - up to 3 days after onset of rash
(d) German measles - 7 days after onset of rash

52. Lyme disease is transmitted by:
(a) Rat flea (b) Tick
(c) Mite (d) Mosquito

53. Following are examples of human "dead end" disease except:
(a) Bubonic plague
(b) Japanese encephalitis
(c) Hydatid disease
(d) Leishmaniasis

54. Chemoprophylaxis is not required in is:
(a) Typhoid
(b) Meningococcal meningitis
(c) Bacterial conjunctivitis
(d) Malaria

55. Which disease does not occur as seasonal variation?
(a) Measles (b) Rubella
(c) Gastroenteritis (d) Cerebra meningitis

56. The following fall under the category of enzootic except:
(a) Influenza (b) Anthrax
(c) Brucellosis (d) Endemic typhus

57. Tick borne relapsing fever is caused by?
(a) Borrelia recurrentis
(b) Borrelia burgdorferi
(c) Rickettsia prowazeki
(d) Borellia hermsiiand Non-communicable Diseases

58. Saddleback fever is known as
(a) Brucellosis (b) Dengue fever
(c) Malaria fever (d) Typhoid fever

59. Chemoprophylaxis is not required in
(a) Conjunctivitis (b) Meningitis
(c) Measles (d) Plague

60. Following is NOT caused by virus
(a) Rocky mountain spotted fever
(b) KFD
(c) Dengue
(d) Yellow fever

61. Transplacental transmission is not seen in
(a) Hepatitis A (b) Hepatitis B
(c) HIV (d) Varicella

62. MC Shigella subtype in India is
(a) Shigella dysenteriae
(b) Shigella flexneri
(c) Shigella boydii
(d) Shigella sonnei

63. Mode of spread of Ebola virus
(a) Aerogenous (b) Body fluids
(c) Water-borne (d) Insect bite

64. Consider the following diseases
1. Measles
2. Polio
3. Staphylococcal food poisoning
4. Typhoid (Which of the above are the correct examples for incubation period of 10-14 days?)
(a) 1 and 3 (b) 2 and 4
(c) 1 and 4 (d) 3 and 4

65. Staphylococcus food poisoning causes all except:
(a) Due to enterotoxin
(b) IP below 6 hours
(c) Sudden onset
(d) Fever common

66. Inclusion body in neuron is seen in:
(a) Rabies
(b) Diphtheria
(c) Yellow fever
(d) Japanese encephalitis

67. Man is dead end for:
(a) Tetanus, measles
(b) Measles, yellow fever
(c) Tetanus, yellow fever
(d) Rabies, tetanus

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68. Agent can be used in bioterrorism:
(a) Plague (b) Typhoid
(c) Streptococcus (d) Staph. aureus

69. Incubation period is less than one week in:
(a) Cholera (b) Enteric fever
(c) Hepatitis B (d) Chickenpox

70. Sub acute-Sclerosing pan - encephalitis (SSP(E) is caused by:
(a) Measles (b) Mumps
(c) Rubella (d) Smallpox

71. Clinical features of Botulism are all Except:
(a) Diarrhea (b) Dysarthria
(c) Ocular nerve paralysis
(d) Blurring of vision

72. Pleomorphism is seen in:
(a) Chickenpox (b) Rubella
(c) Smallpox (d) Toxocara

73. Amphixenosis is:
(a) Ascaris lumbricoidis
(b) Entrobius - vermicularis
(c) Anthrax
(d) T. cruzi

74. Following are examples of human "dead end" disease except:
(a) Bubonic plague
(b) Japanese encephalitis
(c) Hydatid disease
(d) Leishmaniasis

75. All are zoonotic disease except:
(a) Brucellosis (b) Leptospirosis
(c) Scabies (d) Rabies

76. Shortest Incubation period is associated with:
(a) Influenza (b) Cholera
(c) Syphilis (d) AIDS

77. Disease transmitted by water is:
(a) Hepatitis B (b) Polio
(c) Japanese encephalitis (d) Dengue fever

78. Which of the following flavi virus is closely related to Russian spring summer encephalitis causing virus:
(a) Dengue (b) Chikungunya
(c) KFD (d) Yellow fever

79. Which statement is not true in arboviral disease?
(a) Japanese encephalitis is transmitted by culex
(b) KFD is transmitted by Ticks
(c) Filariasis is transmitted by Aedes mosquito
(d) Dengue is transmitted by Aedes mosquito

80. All of the following are Anthropozoonotic Diseases except:
(a) Plague (b) Rabies
(c) Hydatid cyst (d) Dracunculosis

81. Leptospira icterohaemorrhagiae infection is transmitted by the following animals:
(a) Rats (b) Dogs
(c) Birds (d) Bats

82. Patients are to be isolated in all of the following diseases except:
(a) AIDS (b) Smallpox
(c) Anthrax (d) Plague

83. Cyclops is an intermediate host for:
(a) Guinea worm (b) Malaria
(c) Rabies (d) Salmonella

84. Tick-borne disease is:
(a) Tularemia (b) Q fever
(c) Relapsing fever (d) Dengue fever

85. Aedes transmit which of the following disease in India:
(a) Dengue (b) Kala Azar
(c) Malaria/Filaria (d) Japanese encephalitis

86. Cyclopropogative cycle is seen is
(a) Malaria (b) Filaria
(c) Yellow fever (d) Plague

87. Food poisoning is caused by all except:
(a) Staphylococcus aureus
(b) Clostridium difficile
(c) Vibrio parahaemolyticus
(d) Bacillus cereus

88. Incubation period in staphylococcal food poisoning:
(a) 1-6 hours (b) 6-12 hours
(c) 16-18 hours (d) 24 hours

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89. Isolation is not useful in:
(a) Polio (b) Cholera
(c) Measles
(d) Diphtheriaand Non-communicable Diseases

90. Which of the following is most prevalent presently in India:
(a) Polio (b) Dracunculiasis
(c) Plague (d) Kala-azar

91. Man is a dead-end host in all of the following infections except:
(a) Teniasis (b) Rabies
(c) Japanese encephalitis (d) Tetanus

92. Iceberg phenomena is seen in all except:
(a) Leprosy (b) Rabies
(c) Hypertension (d) Tuberculosis

93. Antigenic shift and drift occurs in:
(a) Measles (b) Mumps
(c) Influenza (d) Rubella

94. Yaws is a disease caused by:
(a) Treponema Pertenue
(b) Treponema Pallidum
(c) Treponema Carateum
(d) Trypanosoma Cruzi

95. Due to epidemiological reasons chemo-prophylaxis is most impractical in the control of:
(a) Measles (b) Cholera
(c) Diphtheria (d) Tuberculosis

96. Plague is what type of zoonosis?
(a) Cyclozoonosis (b) Direct zoonosis
(c) Sapro-zoonosis (d) Meta zoonosis

97. Which is not a zoonotic disease?
(a) Brucellosis (b) Malaria
(c) Rabies (d) Trichinoses

98. Which is not a zoonotic disease?
(a) Tetanus (b) Rabies
(c) Brucellosis (d) Hydatid disease

99. Shortest incubation period is of:
(a) Diphtheria (b) Rubella
(c) Smallpox (d) Chickenpox

100. Which one of the following is an Index of communicability of an Infection?
(a) Carrier rate
(b) Prevalence rate
(c) Secondary attack rate
(d) Primary attack rate

Answers of MCQ on Other Communicable Diseases

1. Ans. (c) HIV
2. Ans. (a) Spread by sexual transmission
3. Ans. (b) Leprosy
4. Ans. (c) Toxins can be destroyed by boiling for 30 minutes
5. Ans. (d) Measles
6. Ans. (b) Tuberculosis
7. Ans. (a) Measles
8. Ans. (c) Person to person transmission
9. Ans. (b) Yellow fever
10. Ans. (c) Pertussis
11. Ans. (a) Cough due to Bordetella pertussis
12. Ans. (a) Leprosy
13. Ans. (d) HIV/AIDS
14. Ans. (b) Cattle
15. Ans. (c) Falciparum Malaria
16. Ans. (c) Hepatitis E
17. Ans. (a) Measles
18. Ans. (c) Measles
19. Ans. (b) Hookworm eggs per gram faeces
20. Ans. (a) Trichuris trichura
21. Ans. (b) Insulin
22. Ans. (b) Screening for STD's
23. Ans. (b) Food poisoning
24. Ans. (a) Yellow fever
25. Ans. (a) Chikungunya
26. Ans. (a) Measles
27. Ans. (b) Influenza-A
28. Ans. (a) Rabies;
29. Ans. (c) Tetanus
30. Ans. (c) Q fever
31. Ans. (b) Overhead tanks severe as breeding sites

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32. Ans. (c) Scabies
33. Ans. (c) Vertical transmission
34. Ans. (d) Yellow Fever
35. Ans. (c) Measles
36. Ans. (d) Later stages involve heart and nerves
37. Ans. (a) Cholera
38. Ans. (c) Whooping cough
39. Ans. (c) Japanese encephalitis
40. Ans. (c) Pertussis
41. Ans. (a) Scabies
42. Ans. (a) Leptospirosis
43. Ans. (a) Cholera
44. Ans. (d) Molluscum contagiosum
45. Ans. (a) Hydatid cyst
46. Ans. (c) Measles
47. Ans. (a) TB
48. Ans. (b) Hepatitis C
49. Ans. (c) Rabies
50. Ans. (b) Doxycycline
51. Ans. (d) German measles - 7 days after onset of rash
52. Ans. (b) Tick
53. Ans. (d) Leishmaniasis
54. Ans. (a) Typhoid
55. Ans. (c) Gastroenteritis
56. Ans. (a) Influenza
57. Ans. (d) Borellia hermsii
58. Ans. (b) Dengue fever
59. Ans. (c) Measles
60. Ans. (a) Rocky mountain spotted fever
61. Ans. (a) Hepatitis A
62. Ans. (b) Shigella flexneri
63. Ans. (b) Body fluids
64. Ans. (c) 1 and 4
65. Ans. (d) Fever common
66. Ans. (a) Rabies
67. Ans. (d) Rabies, tetanus
68. Ans. (a) Plague
69. Ans. (a) Cholera
70. Ans. (a) Measles
71. Ans. (a) Diarrhea
72. Ans. (a) Chickenpox
73. Ans. (d) T. cruzi
74. Ans. (d) Leishmaniasis
75. Ans. (c) Scabies
76. Ans. (b) Cholera
77. Ans. (b) Polio
78. Ans. (c) KFD
79. Ans. (c) Filariasis is transmitted by Aedes mosquito
80. Ans. (d) Dracunculosis
81. Ans. (a) Rats
82. Ans. (a) AIDS
83. Ans. (a) Guinea worm
84. Ans. (a) Tularemia
85. Ans. (a) Dengue
86. Ans. (a) Malaria
87. Ans. (b) Clostridium difficile
88. Ans. (a) 1-6 hours
89. Ans. (a) Polio
90. Ans. (d) Kala-azar
91. Ans. (a) Teniasis
92. Ans. (b) Rabies
93. Ans. (c) Influenza
94. Ans. (a) Treponema pertenue
95. Ans. (d) Tuberculosis
96. Ans. (d) Meta zoonosis
97. Ans. (b) Malaria
98. Ans. (a) Tetanus
99. Ans. (a) Diphtheria
100. Ans. (c) Secondary attack rate

MCQ on Non Communicable Disease

Coronary Heart Disease (CHD)

1. Following dietary changes are advised to reduce prevalence of coronary heart disease except:
   (a) Increased complex carbohydrate intake
   (b) Saturated fat intake less than 10% of total energy intake
   (c) Salt intake less than 20g/day
   (d) Reduce fat intake to 20-30% of total energy intake

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2. Which one of the following statements about influence of smoking on risk of coronary heart disease (CHD) is not true?
   (a) Risk of death from CHD decreases from cessation of smoking
   (b) Filters provide a protective effect for CHD
   (c) Influence of smoking is synergistic to other risk factors for CHD
   (d) Influence of smoking is directly related to number of cigarettes smoked per day
3. Which of the following is maximally associated with coronary heart disease?
   (a) HDL (b) VLDL
   (c) LDL (d) Chylomicrons
4. Which of the following is not a dietary modification recommended in high risk cardiovascular group?
   (a) LDL cholesterol less than 100 mg/dL
   (b) Avoid alcohol
   (c) Saturated fat intake 7% of total calories
   (d) Salt intake less than 5 grams
5. Inability to perform any work without discomfort is
   (a) NYHA 1 (b) NYHA 2
   (c) NYHA 3 (d) NYHA 4
6. Clinical goal of "cholesterol / HDL ratio" recommended for CHD prevention is
   (a) < 3.5 (b) < 2.5
   (c) < 10.5 (d) < 1.5
7. All are true for coronary heart disease in India compared to west except:
   (a) Increasing
   (b) Decreasing
   (c) Common in younger age
   (d) None
8. False about coronary heart disease:
   (a) Indian CHD occurs 1 decade later than Western CHD
   (b) Heavy cigarette smoking is a risk factor
   (c) Males are affected more than females
   (d) None
9. All of the following are true about coronary heart diseases in India except:
   (a) Smoking predisposition seen
   (b) Mean age of patient is 10-20 years more than that of western
   (c) Seen more in males
   (d) DM predisposition to MI is seen
10. Best-know large sample study programme for coronary heart disease is:
   (a) Framingham study (b) North kerelia study
   (c) Standford study (d) Oxford study
11. Modifiable risk factors in coronary artery disease are all except:
   (a) Personality (b) Smoking
   (c) Obesity (d) Hypertension

Hypertension

12. True about hypertension, the primary prevention includes except:
   (a) Weight reduction
   (b) Exercise promotion
   (c) Reduction of salt intake
   (d) Early diagnosis of hypertension
13. Modifiable risk factors for hypertension is?
   (a) Ethinicity (b) Age
   (c) Sex (d) Obesity
14. Tracking of BP implies
   (a) BP increase with age
   (b) BP decreases with age
   (c) BP of hyoptensive become hypertensive
   (d) BP of hyoptensive remain hypotensive
15. What is DASH?
   (a) Dietary approaches to stop hypertension
   (b) Domestic approach to safeguard hepatitis
   (c) Dietary approaches to stop hyperlipidemia
   (d) Domestic approaches to stop hypertension
16. Diet to be prescribed in hypertension
   (a) Fruits, vegetables and low salt diet
   (b) Proteins, fibres and low salt diet
   (c) Carbohydrate, fibres and low salt diet
   (d) Fruits, vegetables, Low fat dairy foods

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Rheumatic Fever

17. All of the following statements about rheumatic fever/ heart disease epidemiology in India are true except:
    (a) Its prevalence varies between 2 to 11 per 1000 children aged 5-16 years
    (b) Mitral regurgitation is the commonest cardiac lesion seen
    (c) It occurs equally in females and males
    (d) Rheumatic fever occurs in about 2% of streptococcal sore throats
18. All are true about Rheumatic Fever in India except:
    (a) RF is reported in 1-3 % of streptococcal infections
    (b) More commonly seen in 5-15 years age group
    (c) Except carditis, other manifestations do not cause permanent damage
    (d) In Revised Jones' Criteria, evidence of preceding streptococcal infection is taken for last 21 days
19. All of the following are Major criteria of Jones in Rheumatic fever except:
    (a) Pancarditis (b) Arthritis
    (c) Chorea (d) Elevated ESR
20. Not included among major criteria in acute rheumatic fever is:
    (a) Erythema marginatum
    (b) Polyarthralgia
    (c) Chorea
    (d) Pancarditis
21. Rheumatic Heart Disease can be prevented by
    (a) Screening of school going children
    (b) Vaccination against Streptococcus
    (c) Treatment of respiratory infections in children
    (d) All of these and communicable Diseases

Cancers

22. The most common cancer affecting Indian urban women in Delhi, Mumbai and Chennai is:
    (a) Cervical cancer (b) Ovarian cancer
    (c) Breast cancer (d) Uterine cancer
23. The most common cancer, affecting both males and females of the world, is:
    (a) Cancer of the pancreas
    (b) Buccal mucosa cancer
    (c) Lung cancer
    (d) Colorectal cancer
24. The most common type of cancer among females in India is:
    (a) Cervical cancer (b) Breast cancer
    (c) Ovarian cancer (d) Colonic cancer
25. Habits and customs are conducive to cancer as evident below except:
    (a) Kangri cancer in Kashmir due to hot pot in winter
    (b) Oral cancer due to pan chewing in India
    (c) Penile cancer and cervical cancer following circumcision
    (d) Lung cancer due to smoking
26. HPV Vaccination True A/E:
    (a) Protects from Ca Cx in >70% cases
    (b) 2 primary doses req for immunization
    (c) Protects against HSV 16 and 18
    (d) Mixed vaccine, needs refrigeration
27. Current cancer patients in India reported annually:
    (a) 0.5 million (b) 1 million
    (c) 5 millions (d) 10 millions
28. Globally most common cancer is:
    (a) Colorectal cancer (b) Bladder cancer
    (c) Lung cancer
    (d) Oropharyngeal cancer
29. The most common cancer, affecting Indian urban women in Delhi, Mumbai and Chennai is:
    (a) Cervical cancer (b) Ovarian cancer
    (c) Breast cancer (d) Uterine cancer
30. Tobacco responsible for oral cancer is
    (a) 100% (b) 40%
    (c) 90% (d) 60%
31. Maximum mortality in India among women is due to which carcinoma?
    (a) Lungs (b) Cervix uteri
    (c) Ovary (d) Breast

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32. Which of the following is the MC malignant tumor in Adult males in India?
    (a) Lung cancer
    (b) Oropharyngeal carcinoma
    (c) Gastric carcinoma
    (d) Colorectal carcinoma
33. Early warning signs of Cancer that Public should be aware include all except:
    (a) Persistent cough
    (b) Lump or hard area in breast
    (c) Unexplained weight gain
    (d) Change in wart/mole
34. Best method of screening for early detection of carcinoma breast in young woman is:
    (a) Regular X-rays (b) Self examination
    (c) Mammography (d) Regular biopsies
35. "Field carcinogenesis" is seen in:
    (a) Head and neck carcinoma
    (b) Colon carcinoma
    (c) Brain tumor
    (d) Breast carcinoma
36. Risk factors for Cancer cervix are increased by the following:
    (a) Less than 20 years of age
    (b) Late marriage
    (c) Upper socio-economic class
    (d) Early marriage

Answers of MCQ on Non-Communicable Disease

1. Ans. (b); (c) Salt intake less than 20g/day
2. Ans. is (b) Filters provide a protective effect for CHD
3. Ans. (c) LDL
4. Ans. (a) LDL cholesterol less than 100 mg/dL
5. Ans. (d) NYHA 4
6. Ans. (a) < 3.5
7. Ans. (b) Decreasing
8. Ans. (a) Indian CHD occurs 1 decade later than Western CHD
9. Ans. (b) Mean age of patient is 10-20 years more than that of western
10. Ans. (a) Framingham study
11. Ans. (a) Personality
12. Ans. (d) Early diagnosis of hypertension
13. Ans. (d) Obesity
14. Ans. (d) BP of hyoptensive remain hypotensive
15. Ans. Ans. (a) Dietary approaches to stop hypertension
16. Ans. Ans. (d) Fruits, vegetables, Low fat dairy foods
17. Ans. (b) Mitral regurgitation is the commonest cardiac lesion seen
18. Ans. (d) In Revised Jones' Criteria, evidence of preceding streptococcal infection is taken for last 21 days
19. Ans. (d) Elevated ESR
20. Ans. (b) Polyarthralgia
21. Ans. (a) Screening of school going children
22. Ans. (c) Breast cancer
23. Ans. (c) Lung cancer
24. Ans. (b) Breast cancer
25. Ans. (c) Penile cancer and cervical cancer following circumcision
26. Ans. (b) 2 primary doses req for immunization
27. Ans. (b) 1 million
28. Ans. (c) Lung cancer
29. Ans. (c) Breast cancer
30. Ans. (c) 90%
31. Ans. (d) Breast
32. Ans. (b) Oropharyngeal carcinoma
33. Ans. (c) Unexplained weight gain
34. Ans. (b) Self examination
35. Ans. (a) Head and neck carcinoma
36. Ans. (d) Early marriage

MCQ on Obesity

1. For Asian populations, the normal BMI (Body Mass Index) range is:
    (a) 18.5 - 24.99 (b) 18.5 - 22.99
    (c) 20.5 - 24.99 (d) 20.5 - 22.99
2. What will be the BMI of a male whose weight is 89 kg and height is 172 cm?
    (a) 27 (b) 30
    (c) 33 (d) 36

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3. All of the following sites are used for measuring skin fold thickness to assess obesity except:
   (a) Mid-triceps (b) Biceps
   (c) Subscapular
   (d) Anterior abdominal wall
4. Which of the following indices of obesity is height-independent?
   (a) Quetelet's Index (b) Ponderal Index
   (c) Broca's Index (d) Corpulence Index
5. A patient is called obese if BMI is:
   (a) 20-30 (b) > 25
   (c) > 30 (d) > 40
6. Internationally accepted method of measuring obesity is:
   (a) BMI (b) Ponderal index
   (c) Lorentz index (d) Corpulence index
7. Which of the following should be done to reduce obesity?
   (a) Regular exercise with same amount of food
   (b) Decrease fat intake but have stomach full
   (c) Reduce the amount of fat in diet only
   (d) Reduce intake of fats, carbohydrates and protein
8. An adult is considered to be overweight if he/she has the BMI:
   (a) >18.5 (b) > 20
   (c) > 25 (d) None of the above
9. Overweight BMI:
   (a) 25-29.99 (b) 15-18.5
   (c) 18.5-24.99 (d) 30-34.99
10. Calculate BMI if weight in kilograms is 98 and height in centimetres is 175:
   (a) 28 (b) 32
   (c) 36 (d) 40
11. Which index of obesity does not include height?
   (a) BMI (b) Ponderal's index
   (c) Broca's index (d) Corpulence index
12. Corpulence index means:
   (a) Measurement of obesity
   (b) Measurement of copper level in serum
   (c) Measurement of iron losses in faeces
   (d) Pressure difference b/w chambers of Heartand Non-communicable Diseases
13. Which is the cutoff level of Waist-Hip Ratio in Women indicating abdominal fat accumulation?
   (a) 0.75 (b) 0.85
   (c) 0.95 (d) 1.05
14. What will be the BMI of a male whose weight is 89 kg and height is 172 cm:
   (a) 27 (b) 30
   (c) 33 (d) 36
15. Corpulence index means:
   (a) Measurement of obesity
   (b) Measurement of copper level in serum
   (c) Measurement of iron losses in faeces
   (d) Pressure difference b/w chambers of heart
16. Assessment of obesity by following measurement except:
   (a) Quetelet's index (b) Broca index
   (c) Corpulence index (d) Sullivan's index
17. Body mass index is also known as:
   (a) Broca's index (b) Corpulence index
   (c) Quetelet's index (d) Lorentz's formula
18. Abdominal fat accumulation is assessed by:
   (a) Corpulence index (b) Broca's index
   (c) Ponderal index (d) Waist to hip ratio
19. BMI (body mass index) is defined as:
   (a) 2 Weight (kg) (Height) (meters)
   (b) 16 Weight (Kg) (Height) (cm)
   (c) Midarm circumference (cm) Head circumstance (cm)
   (d) Midarm circumference (cm) between ages of 1-5 years

Answers of MCQ on Obesity

1. Ans. (b) 18.5 - 22.99
2. Ans. (b) 30
3. Ans. (d) Anterior abdominal wall
4. Ans. (d) Corpulence Index
5. Ans. (c) > 30
6. Ans. (a) BMI

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7. Ans. (a) Regular exercise with same amount of food
8. Ans. (c) > 25
9. Ans. (b) 32
10. Ans. (b) 30
11. Ans. (d) Corpulence index
12. Ans. (a) Measurement of obesity
13. Ans. (b) 0.85
14. Ans. (b) 30
15. Ans. (a) Measurement of obesity
16. Ans. (d) Sullivan's index
17. Ans. (c) Quetelet's index
18. Ans. (d) Waist to hip ratio
19. Ans. (a) 2 Weight (Kg) (Height) (meters)

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Chapter 12

Environmental Health

Syllabus

Air: Properties of Vayu and composition of air. Changes in air of the occupied room. Comfort zone and indices of thermal comfort. Air pollution -causes, prevention and control. Effects of air pollution on health and social aspects. Effects of Global warming with recent updates. Definition of ventilation and types of Ventilation. Effects of high altitude and mountain air on health.

Learning objectives

1. Describe the properties of Vayu and state the composition of air.
2. Specify the changes in air of the occupied room.
3. Explain comfort zone and indices of thermal comfort.
4. Comprehend the causes, prevention and control of air pollution. Discuss the effects of air pollution on health and social aspects.
5. Elaborate the effects of Global warming with recent updates.
6. Define ventilation and illustrate its types.
7. Explain the effects of high altitude and mountain air on health.
8. Understanding the Environment protection Act,1986

Total - 15 hours (Lecture :10 hour, Non-lecture: 5 hours)
MCQ- Yes- SAQ (5 Marks)- Yes- LAQ (10 Marks)- Yes

Air (Vayu)

Vayu (Air)- Air is absolutely essential for the maintenance of life. The two main function of air are interchanging of gases in the process of respiration and regulation of body temperature.

Properties of Vayu

Vayu Guna according to Sushruta Samhita (Properties of Vayu as per different directions)

अथवातगुणान्वक्ष्यामः–

पुर्वः समधुरः स्निग्धोलवणश्चैमारुतः ।
गुरुर्विदाहजननोरक्तपित्ताभिवर्धनः ॥
क्षतानां विषजुष्टानां व्रणिनः श्लेष्मलाशये ।
तेषामेवविशेषेणसदारोगविवर्धनः ॥
वातलानांप्रशस्तश्च श्रान्तानांकफशोशिणाम ।
मधुरश्चाविदाहीचकषायानुरसोलघुः ।
दक्षिणोमारुतः श्रेष्ठश्चक्षुष्योबलवर्धनः ॥
रक्तपितप्रशमनोनचवातप्रकोपणः ।
विशदोरुक्षपरुषः खरः स्नेहबलापहः ॥
पश्चिमोमारुतस्तीक्ष्णः कफमेदोविशोषनः ।
सद्यः प्राणक्षयकरः शोषणस्तुशरिरिणाम ॥
उत्तरोमारुतः स्निग्धोमृदुर्मधुरएवच ।
कषायानुरसः शीतोदोषाणांचाप्रकोपणः ॥
तस्माच्चप्रकृतिस्थानाम्क्लेदनोबलवर्धनः ।
क्षीणक्षयविषार्तानांविशेषेणतुपूजितः ।

(सु.सू. 20/23-29)

Breeze from the **East** is Madhura and Lavana, Snigdha, hard for digestion, produces burning sensation during digestion, and aggravates Rakta and pitta always, it exacerbates the diseases of those suffering from wounds, poison, ulcers and of persons of Kapha, it is good for persons of Vata

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Prakruti, the fatigued and those suffering from consumption of Kapha origin.

Breeze from **South** is Madhura, does not cause heart burn, is light, it is best for health, good for eyes, enhances strength, alleviates Rakta and Piita and does not aggravate Vata.

Breeze from **West** is dry, rough, string, decreases unctuousness and strength, is penetrating, dries up Kapha and Medas, reduces Prana and causes emaciation.

Breeze from the **North** is unctuous, soft, sweet, astringent in secondary taste, cold, do not aggravates the Doshas, hence it causes moistness and enhances strength in healthy persons, it is beneficial especially for those suffering from emaciation, consumption and poison.

Air is absolutely essential for the maintenance of life. The two main function of air are interchanging of gases in the process of respiration and regulation of body temperature.

Dushita Vayu (vitiated air)

विषौषधिपुष्पगन्धे न वायुनोपनीयतेना क्रम्यते यो देशस्तत्र दोषप्रकृत्यविशेषण कास श्वास प्रतिश्याय शिरोरुग ज्वरैरुपतप्तन्ते ग्रह नक्षत्र चरितैर्वाः ॥ (सु.सू. 6/19)

तत्रवातमेवअनारोग्यकरंविद्यात । तद्यथाऋतुविषमअतिस्थिमितं, अतिचलित, अतिपरुष, अतिशीत, अत्युष्णं अतिरुक्ष, अत्यभिष्यन्दनं, अतिभैरवारावं, अतिप्रतिहतंपरस्परगतिकुण्डलिनिअसात्म्यगन्ध, वाष्प, सिकता, फाशुधूमोपहमिति ॥ (च.वि. 3/7)

Poison which is given in the form of flower smell produce Kasa, Shwasa, Pratishyaya, Shiroruja, Jwara etc. Air withfollowing characteristics is injurious to health. Atistimitam(Excessive calmness), Atichalam (violent blows), Atiparucam (excessive dryness), Atishita (cold), AtyuchGam(hot air), Atiruksham (rugh), Atyabhishyandinam (humidity), Atibhairavam Atipatihata (excessive clashes among each other wind blowing from one direction clashing with the one from the other) Paraspara Gatim Atikundalina (excessively cyclonic in nature) and Asatmya Gandha, Baspa Sikata Pamshu Dhumapahatamiti (association with unwholesome smell, gases, sand, ashes and smoke).

Vayu Karya (air function in normal and abnormal condition)

तद्यथाधरणी, धरणं, ज्वलनोज्ज्वालनम, आदित्यचन्द्रनक्षत्रग्रहगणानां, सन्तानगतिविधान, सृष्टिश्चमेघानां, अपाविसर्ग, प्रवर्तनस्त्रोतसांफलपुष्पानां चाभिनिर्वर्तनं, उद्भेदनंचौदभिदानांऋतुना प्रविभाग, विभागोधातूनांधातूमानसंस्थाव्यक्ति, बीजभिसस्कांरशस्याभिवर्धनविक्लेदोषशोषणिअवैकारिकविकारश्चेति ॥ (च.सू. 12/8)

Function of air sentence of earth, kindling of fire, movement of Surya, Candra, Nakshatra and Graha, creation of clouds, showering rain, flowing of rivers, maturity of flower and fruits, germination of seeds, development of plants, classification of seasons, five Mahabhuta, bring about dryness, hardness and transformation everywhere.

Vitiated air effects

प्रकुपितस्य खल्वस्य लोकेषु चरतः कर्माणामानि भवन्तिः तद्यथा-शिखरिशिखरावमथनम, उन्मथननोकहानाम, उत्पीडनं सागराणाम, उद्वर्तनं सरसां, प्रतिसरणमापगानाम, आकम्पनं च भूमेः, आधमनमम्बुदानां, नीहारनिर्हादपांशुसिकता मत्स्यभेकोरगक्षार रुधिराश्माशनिविसर्गः व्यापादनं च षण्णामृतूनां, शस्यानामसघात; भूतानां प्रभवश्चाव्ययश्च, भूतानां भावाभावकरः, सुखासुकायोर्विधाता, मृत्युः, यमः, नियमा, प्रजापतिः, अदितिः, विश्वकर्मा, विश्वरूपः, सर्वगः, सर्वतन्त्राणां विधाता, ध्रुवानामणुः, विभुः, विष्णुः, क्रान्ता लोकानां, वायुरेव भगवानिती ॥ (च.सू. 12/8)

Aggravated Vayu, breaking of peak of mountains, uprooting the trees, disturbing of ocean, overflowing of lakes, changing of course of rivers, earth quakes, thunders, storm, disturbance of six seasons, spread epidemics among living beings, clouds etc.

Vayu Shudhi Prakara - Ayurvedic aspect (purification of air)-

लाक्षाहरिद्रातिवेषाभयाद्वसरेणुकैलादलवल्ककुष्ठम ।
प्रियगुकाञ्जाष्ठनिलेनिढायधूमनिलौचाषिविशोधयेते ॥ (सु.क. 3/17)

Laksha, Haridra, Ativisha, Abhaya, Harenu, Ela, Valka, Kustha, Priyagu are used in the form

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of fumes to purity air.

Karpura, Devadaru, Dhup, Chandana, Shreevaasa, Sarjaa, Agaru, Nimba, Somaraji, Gandhaka, Guggulu are used in Havana.

Buringdurg like Nagakeshara, Jati, Patola, Nimba, Bilva, Nirgundi, Kamala etc.

Agnihotra for Atmosphere purification

Agnihotra fills the atmosphere with beneficial nutrients and purifies it. It has catalytic effects in the atmosphere and helps reset nature cycles so as to attain the vital harmony and equilibrium. The atmosphere created by performing this ritual is highly appropriate for practicing other spiritual disciplines. Furthermore, Agnihotra may be also be used for medicines or for purifying water resources.

Air

Air forms the most immediate environment of man with which he is in constant contact throughout his life. The importance of clean air for man's health is thus self evident. Even from a symbolic point of view, it is well to keep in mind that while a man consumes 1.2kg of solid food and drinks 1.8 kg of liquids, he breathes as much 14kg of air per day.

Air atmosphere

a. External atmosphere, i.e. air space outside the room

b. Internal atmosphere, i.e. air space inside the room of a building.

Agents affect the atmosphere

1. Physical agents

   a) Temperature b) Humidity c) Wind velocity d) Pressure of atmospheric air.

2. Chemical agents: Dust, soot, smoke, other organic and inorganic particles eliminating from houses, factories and vehicles, etc.

3. Biological agents: Bacteria and viruses etc.

Composition of Air

A mechanical mixture of gases.

Normal composition of air by volume is approximately,

Nitrogen	: 78.084%
Oxygen	: 20.947%
Argon	: 0.934 %
Carbon dioxide	: 0.033%

The balance is made up of other gases which occur in traces like, Neon, Krypton, Xenon Sulfur dioxide, Hydrogen, Nitrogen dioxide& Helium.

In addition, it also contains water vapors, traces of ammonia & suspended matter such as dust, bacteria, spores & vegetable debris.

Factors affecting atmospheric environment

1. Meteorological variables:
   a. Degree of sunshine
   b. Atmospheric pressure
   c. Humidity
   d. Rainfall
   e. Air temperature

Good climate and pleasant weather are soothing and health promoting.

2. Geographical conditions:
   a. Distance from the equator.
   b. Distance from the sea & high above sea level.
   c. Nature of soil (rocky, sandy, loamy or clayey).
   d. Terrain (plain or hilly)

The above factors modify the climate by bringing about changes in temperature, rainfall, humidity direction and velocity of winds and atmospheric pressure.

3. Human Activities and industries: Household activities and industries add noise, radiation smoke, soot and various types ofdusts to the atmosphere which may become detrimental to healthy living.

Impurity

Air is rendered by:

- Respiration of men and animals
- Combustion of coal, gas, oil etc.
- Decomposition of organic matters
- Radioactive dusts and isotopes
- Trade, traffic & manufacturing processes.

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Self-Cleansing Mechanisms :

- Wind: Dilutes & sweeps away the impurity by its movement.
- Sunlight: The atmospheric temperature & sunlight oxidize the impurities & kills bacteria.
- Rain: Cleanses atmosphere by removing the suspended & gaseous impurities.
- Plant life: Green plants utilize the CO_2 & generate O_2 & visa versa at night.

Air of Occupied Room

Chemical changes:

- Air becomes progressively contaminated by CO_2 & O_2 content decreases due to metabolic processes.
- An average person at rest gives of 0.7 c.ft. per hour & during physical activity may be up to 2 c.ft. perhour.
- In a mixed gathering the per capita output of CO_2 is taken as 0.6 c.ft. perhour.

Physical Changes: most important :

- Rise in temperature: Indoor temperature tends to rise as a result of emanation of body heat.
- Increase of humidity: Due to moisture evaporated from skin & lungs. The expired air contains about 6% of water vapor.
- Decrease in air movement: In crowed places, the natural movement of air is impeded.
- Body odors: Unpleasant odors arise from foul breath, perspiration, bad oral hygiene, dirty clothes & other sources. The production of body odors depends upon social status, age & personal hygiene of people.
- Bacterial pollution: Exhaled air contains microorganisms in suspension which are principally saprophytic & may include pathogenic bacteria. These organisms are discharged into the air during conversation, coughing, sneezing & loud talking.

Discomfort

- It is a subjective sensation which people experience in ill-ventilated & crowed rooms.
- If temperature & humidity are kept satisfactory, increased CO_2 content >5% & decreased O_2 content <18% will not affect adversely.
- e.g. 'Black Hole of Kolkata'- 146 prisoners in a room 18 x 14 x 10,with 2 small windows which were sufficient to supply O_2 needs; only 23 survived due to physical condition of air leading to 'heat retention'.
- Causes of discomfort are temperature, humidity, air movement & heat radiation.
- These factors determine the "cooling power" of the air with respect to human body.
- "The problems of ventilation are physical not chemical; coetaneous not respiratory" - Professor Lee.

Indices of Thermal Comfort

1. Air temperature
2. Air temperature & humidity
3. Cooling power: An instrument was devised by Hill called Kata Thermometer to measure it. A dry Kata reading of 6 & above & a wet Kata reading of 20 & above were regarded as indices of thermal comfort.
4. Effective temperature: An arbitrary index which combines into a single value the effect of temperature, humidity & movements of the internal air.
5. Corrected effective temperature:
   - An improvement over Effective Temperature.
   - Instead of dry bulb temperature, the reading of Globe thermometer is used to allow for radiant heat.
   - CET deals with air temperature, velocity, humidity &mean radiant heat.
   - ET & CET are widely used as indices of thermal comfort.
   - McArdle's Maximum allowable sweat rate.

Comfort Zones

It is the range of corrected effective temperature in which the individual or worker in an industry feels comfortable. Defined as the range of effective temperatureover which the majority of adults feel comfortable.

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Comfort depends on physical, physiological & psychological factors.

Considering only the environmental factors, 'comfortable thermal conditions are those under which a person can maintain normal balance between production & loss of heat, at normal body temperature & without sweating'.

Comfort Zones (Evaluated in India)

	Corrected Effective Temperature °C
Pleasant & cool	20
Comfortable & cool	20 - 25
Comfortable	25 - 27
Hot & uncomfortable	27 - 28
Extremely hot	28+
Intolerably hot	30+
	Predicted four-hour sweat rate (P_4SR)
Comfort Zone	1-3 liters
Just tolerable	3-4.5 liters
Intolerable	4.5+ liters

Air Pollution

The term Air pollution signifies the presence in the ambient (surroundings) atmosphere of substances (e.g. gases, mixtures of gases and particulate matters) generated by the activities of man in concentrations that interfere with human health, safety or comfort, or injuries to vegetation and animals and other environmental media resulting in chemicals entering the food chain or being present in drinking water and there by constituting additional source of human exposure.

Direct effect of air pollutants

1. On Plants
2. On Animals
3. On Soil
4. Influences the structure and function of ecosystems, including self regulation ability.
5. In the past air pollution meant smoke.

Primary air pollutants

They are emitted in to the atmosphere from a source such as a factory chimney or exhaust pipe or through suspension of contaminates dusts by the wind. In principle, therefore, it is possible to measure the amounts emitted at the source itself.

Secondary air pollutants

They are formed within the atmosphere itself. They arise from chemical reactions of primary pollutants, possibly involving the natural components of the atmosphere, especially oxygen and water.

The most familiar example is ozone, which arises almost entirely from chemical reactions that differ with altitude within the atmosphere. Because of this mode of formation, secondary pollutants cannot readily be included din emissions inventories, although it is possible to estimate formation rates per unit volume of atmosphere per unit time.

Gaseous air pollutants

They are present as gases or vapors that are as individual small molecules capable for passing through filters, provided they do not absorb to or chemically react with the filter medium.

They are readily taken into the human respiratory system, although water - soluble, they may very quickly be deposited in the upper respiratory tract and not penetrate to the deep lung.

Particulate air pollutants

They comprise of material in solid or liquid phase suspended in the atmosphere. Such particles can be either primary or secondary and cover a wide range of sizes.

Newly formed secondary particles can be as small as 1 - 2 m̄ in diameter, while coarse dust and sea salt particles can be as large as 100 m̄ in diameter.

Sources of Air Pollution

The main sources of air pollution are,

1. **Automobiles:** Motor vehicles are a major source of air pollution throughout the urban areas. They emit hydrocarbons, carbon

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monoxide, lead, nitrogen oxides and particulate matter. In addition diesel engines when misused or badly adjusted are capable of emitting black smoke and malodorous fumes.

2. **Industries:** They emit a large amount of pollutants into the atmosphere. Combustion of fuel to generate heat and power produces smoke, So_2, nitrogen ash and fly ash. Petrochemical industries generate hydrogen fluoride, HCL and organic halides. Many industries discharge CO, O_3, CO_2, hydrogen-sulphide and sulphur dioxide.
3. **Domestic sources:** Domestic combustion of coal, wood or oil is major source of smoke, dust, SO_2 and nitrogen oxides.
4. The most direct and important source of air pollution affecting the health of many people is tobacco smoke. Even those who do not smoke may inhale the smoke produced by others (Passive smoking).
5. **Miscellaneous:** These comprise burning of refuse, incinerators, pesticide spraying, natural sources (wind borne dust, fungi, molds, bacteria) and nuclear energy programmes.

Meteorological factors

Most of the gases are within the first 30 Km of atmosphere. Man is in contact with 8-10 Km.Topography, air movement and climate influences air pollution. Wind helps in dispersal and dilution of pollutants. If the topography is dominated by mountains or big buildings, the wind becomes weak and calm and pollutants tend to concentrate in the breathing zone.

Temperature gradient is also important. When there is a rapid cooling of lower layers of air, there is no vertical motion. Pollutants and water vapor get trapped resulting in smog (Temperature inversion) it affects health.

Air Pollutants

More than 100 substances which pollute air have been identified. Carbon monoxide, carbon dioxide, hydrogen sulphide, Sulphur dioxide, sulphur trioxide, nitrogen oxides, fluorine compounds, organic compounds (e.g., hydro-carbons, aldehydes, ketones, organic acids), metallic contaminants (e.g., Arsenic, Zn, iron) radio-active compounds, photochemical oxidants (e.g. ozone) other includes Asbestos, beryllium, mercury, benzene, fluorides, vinyl chloride, lead & radiation. Contaminates differ greatly from place to place depending upon specific complex of contaminant source. Pollutants may be in the form of solids, liquids (vapours) or gases. Combination of smoke and fog is called Smog.

Carbon Monoxide

Most common& widely distributed air pollutants.

Sources -

- Unvented kerosene & gas space heaters.
- Leaking chimneys and furnaces
- Back-drafting from furnaces, gas water heaters, wood stoves & fireplaces
- Gas stoves
- Generators and other gasoline powered equipment
- Automobile exhaust from attached garages
- Tobacco smoke
- Incomplete oxidation during combustion in gas ranges & unvented gas or kerosene heaters may cause high concentrations of CO in indoor air.
- Worn or poorly adjusted & maintained combustion devices (e.g. boilers, furnaces).
- Most cities have CO peak levels that coincide with morning & evening rush hrs.
- The fluctuations in ambient concentration is only slowly reflected in the carboxyhae-moglobin levels in humans, as it takes 4-12 hrs for approximate equilibrium between air levels & blood levels to occur.
- Environmental concentrations are expressed in terms of 8 hr average concentration.

Sulphur Dioxide

Sources:

- Combustion of sulphur containing fossil fuels, principally coal & heavy oils.

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- Smelting of sulphur containing ores & other industrial processes.
- Domestic fires
- Widespread domestic use of coal
- Power plants
- Oil refineries
- Kerosene space heaters.
- Acid aerosol - sulphuric acid is a strong acid that is formed from reaction of SO_3 gas with water.
- Strongly hygroscopic.
- 80 microgram / m3 - safe limit in atmosphere.

Lead

Sources: In the past, motor vehicles were the biggest source of lead. Since leaded gasoline has been phased out, lead emissions have decreased by about 98 %.

Today, metal processing is the biggest source of atmospheric lead. The highest air concentrations are found in the vicinity of ferrous and nonferrous smelters & battery manufacturers. Paint (for houses and cars), fishing lures, certain parts of bullets, some ceramic ware, water pipes, and a few hair dye products.

Carbon Dioxide

The principal greenhouse gas emitted as a result of human activity (e.g., burning of coal, oil, and natural gas).

Not commonly regarded as air pollutant, though man generates it in enormous amounts.

It is a natural constituent of air &does not take part in any significant chemical reactions with other substances in air.

Hydrocarbons

Man-made sources: Incineration, combustion of coal, wood, processing & use of petroleum, automobile exhaust, cigarette smoke.These exert their pollutant action by taking part in the chemical reaction which causes photochemical smog.

Adverse effect : Lung cancer

Cadmium

The steel industries, waste incineration, volcanic action & zinc production seems to account for the largest emission.

Tobacco contains Cadmium & smoking may contribute significantly to the uptake of Cadmium.

Cigarettes may contain from 0.5 - 3mcg Cadmium / Gm of tobacco.

These sources of atmospheric Cadmium pollution are of growing concern.

Hydrogen Sulphide

Sources :

- Human activities
- Industries - coke production, viscose rayon production,
- Waste water treatment plant,
- Wood pulp production using sulphate method,
- Sulphur extraction process
- Oil refining & tanning industries.Main toxic substance involved in livestock rearing system with liquid manure storage.
- Firstnoticeable effect of this at low is unpleasant odour.
- Conjunctiva irritation is the next subjective symptom.
- Workers exposed to the concentration of less than 30 mcg / m^3 are reported to have diffuse neurological & mental symptoms.

Ozone- Ozone is a gas that is a variety of oxygen; consists of three oxygen atoms.Ozone in the upper atmosphere, where it occurs naturally in what is known as the ozone layer, shields the Earth from the sun's dangerous ultraviolet rays.

However, at ground level where it is a pollutant with highly toxic effects, ozone damages human health, the environment, crops, & a wide range of natural & artificial materials.

Sources:

- The ozone producing & ozone scavenging processes involve absorption of solar radiation by nitrogen dioxide.
- Ground-level ozone comes from the

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breakdown (oxidation) of volatile organic compounds found in solvents.

- It is also a product of reactions between chemicals that are produced by burning coal, gasoline, other fuels & chemicals found in paints and hair sprays.
- Oxidation occurs readily during hot weather.
- Vehicles & industries are major sources of ground-level ozone.

Particulate Matter

Any type of solid in the air in the form of smoke, dust, &vapors, which can remain suspended for extended periods. Airborne particulate matter represents a complex mixture of organic & inorganic substances.Mass & composition tend to divide into 2 principle groups:

1. Coarse particles larger than 2.5 mm in aerodynamic diameter
2. Coarse particles smaller than 2.5 mm in aerodynamic diameter

Sources:

- Smaller particles contain the secondarily formed aerosols, combustion particles & re-condensed organic & metal vapours.
- The large particles usually contain earth's crustal material & fugitive dust from roads & industries.
- Particles matter of respirable size may be emitted from number of natural & non-natural sources which are dust storms, burning of diesel fuels by trucks & buses, Fossil fuels, Mixing & application of fertilizers & pesticides, Road construction.
- Industrial processes - steel making, mining, agricultural burning & operation of fireplaces & woodstoves.

Safe limit in Air: 100 mcg / m3

Indoor Air Pollution

One of the four most critical global environmental problems probably exposes more people worldwide to important air pollutants than does the pollution in outdoor air. Women & young children suffer the greatest exposure.

Sources-Tobacco smoke, pollen, dust, animal dander, mold, mildew, radon, cleaning products, beauty products, building materials, carpets, furniture, air fresheners, pesticides.

Effects o Air Pollution Health and Social Aspects

Health aspects -Immediate - acute bronchitis, suffocation, death.

Delayed- chronic bronchitis, lung cancer, bronchial asthma, emphysema and respiratory allergies.Lead poisons many systems

Social and Economic aspects- Destruction of plant and animal life, corrosion of metals, damage to buildings, cost of cleaning and maintenance, aesthetic nuisance.

Major air pollutants, sources and adverse effects

Noxious Agent	Sources	Adverse Effects
Oxides of Nitrogen	Automobile exhaust, gas stove and heaters, wood burning stoves, kerosene space heaters	Respiratory Tract irritation, bronchial hyperactivity, impaired lung defenses
Hydro-carbons	Automobile exhaust Cigarette smoke	Lung Cancer
Ozone discomfort	Automobile exhaust	Cough Substernal
Sulphur Dioxide	Power plants, Smelters, Oil refineries, kerosene space heaters.	Exacerbation of Asthma and COPD, respiratory tract irritation, hospitalization may be necessary, death in severe exposure

Prevention and Control of Air Pollution

The control of air pollution is ultimately an engineering problem. The WHO recommended the following procedures for the prevention and control of air pollution.

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1. **Containment:** It is prevention of escape of toxic materials into the ambient air. It is achieved by verity of engineering methods such as enclosure, ventilation and air cleaning.
2. **Replacement:** That is, replacing a technological process causing air pollution, by a new process that does not. Increased use of electricity in place of coal has greatly helped in smoke reduction.
3. **Dilution:** It is valid so long as it is within the self-cleaning capacity of the environment. For example some air pollutants are readily removed by the vegetation. The establishment of green belts between industrial and residential area is an attempt at dilution.
4. **Legislation:** air pollution is controlled in many countries by suitable legislation, e.g. clean air acts; Govt. of India enacted, The Air (prevention and control of pollution) Act in 1981.
5. **International action:** To deal with air pollution on a world wide scale, the WHO has established an international network of laboratories for the monitoring and study of air pollution. The network consists of two international centers at London and Washington, 3 centers at Mascow, Nagpur and Tokyo and 20 laboratories in various parts of the world.

Disinfection of Air

The methods employed for disinfection are,

1. **Mechanical ventilation:** this reduces vitiated air and bacterial density.
2. **UV radiation:** this has been found to be effective in special situations such as operation theatres and infectious diseases wards. Since direct exposure to UV rays is a danger to the eyes and skin, the UV lamps are shaded and kept in the upper portion of the rooms near the inlet of air.
3. **Chemical mists:** Triethyleneglucol vapors have been found to be effective air bactericides, particularly against droplet nuclei and dust.
4. **Dust control:** Application of oil to floors of hospital wards reduces the bacterial content of the air.

Ventilation

The concept of ventilation implies not only the replacement of vitiated air by a supply of fresh outdoor air, but also control of the quality of the incoming air with regards to its temperature, humidity and purity with a view to provide a thermal environment that is comfortable and free from risk of infection.

Uses of Ventilation

1. Smells and odors from the room removed.
2. Bacterial contamination of air in the room is reduced.
3. Chemical composition of air inside the room is maintained constant.
4. The physical conditions of temperature, humidity and movement of room air are maintained constant.

Ill effects in unventilated room

Discomfort felt in a closed or congested room because of chemical changes in the air, such as decrease of oxygen and increase of carbon dioxide, water vapour, bad odour and organic poisons eliminating from human beings.

The ill effects in a congested room are discomfort, restlessness, nausea, vomiting, irritability, giddiness, and fainting etc.

Standards of ventilation

Fixing the standards of ventilation is a matter of much difficulty. Most of the standards of ventilation have been based on the efficacy of ventilation in removing body odour.

1. **Cubic space:** different workers have advocated standards for the minimal fresh air supply ranging from 300 to 3,000 cu. ft. per hour per person.
2. **Air change:** Air change is more important than the cubic space. It is recommended that in the living rooms, there should be 2 or 3 air changes in 1 hour; in work rooms and assemblies 4 to 6 air changes. If the air is changed more frequently that is more than 6 times in 1 hour, it is likely to produce a drought which should be avoided. Based on this concept, it is now considered that a space of

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1,000 to 2,000 cu. ft. per person is quite sufficient.

Adults:

a. Residential- 5 sq.m.
b. Factory (as per factories act, 1948)-5 sq.m.
c. General Hospital-10 sq.m.
d. Infectious disease hospital-15 sq.m.
e. Schools - space per child- 0.8 sq.m.

Types of ventilation

Natural Ventilation & Mechanical Ventilation

Natural Ventilation

It is the simplest system of ventilating small dwellings, schools and offices. In this method, reliance is placed on certain forces which operate in nature. These are:

1. **Wind:** Wind is an active force in ventilation. When it blows through a room, it is called deflation. When there is an obstruction, it bypasses and exerts a suction action at its tail end this is called aspiration. Doors and windows facing each other provide cross ventilation.
2. **Diffusion:** Air passes through the smallest opening or spaces by diffusion.
3. **Inequality of temperature:** Air flows from a high density to low density; it rises when slightly heated and escapes from openings provided high up in the room. The outside air which is cooler and denser will enter the room through the inlets placed low.

Mechanical Ventilation

1. **Exhaust / Vaccum ventilation:** In this system, air is exhausted to the outside by exhaust fans usually driven by electricity. As air is exhausted, a vacuum is created which induces fresh air to enter the room through windows, doors and other inlets.
2. **Plenum ventilation:** In this system, fresh air is blown into the room by centrifugal fans so as to create a positive pressure, and displace the vitiated air.
3. **Balanced ventilation:** This is a combination of the exhaust and plenum system of ventilation. The blowing fan must balance the exhaust fan.
4. **Air conditioning:** It is defined as the simultaneous control of all, or at least the first three of those factors affecting both the physical and chemical conditions of the atmosphere with in any confined space or room. These factors include temperature, humidity, air movement, distribution, dust, bacteria, odors and toxic gases, most of which affect in greater or lesser degree the human health and comfort.

Global Warming

Global warming is unusually rapid increase in earth's average surface temperature over the past century primarily due to the greenhouse gases as people's burn fossils fuels. The global average surface temperature rise 0.6 to 0.9 degree Celsius between 1906 to 2005 and the rate of temperature increase has nearly doubled in the last 50 years.

Main causes of global warming

1. Increase in the amount of carbon dioxide gas in the atmosphere due to excessive deforestation.
2. Increase in the amount of oxides of carbon, oxides of nitrogen produced during the combustion of fossil fuel like coal and petroleum partially or completely.
3. Collection of chlorofluorocarbon in atmosphere due to use of aerosols in refrigerator and air conditioners, use of foams and fire extinguishers.
4. Nitrogen oxides gas is produced by chemical fertilizers used in agriculture and by the combustion of fuel used in automobile.
5. Various biotic activate, agricultural activates and decay of organic wastes produce green house gases causing Global warming.

Effects of Global Warming

1. More heat waves
2. Expansion of desert area
3. Natural fires in forest lands
4. More evaporation of water from oceans and water bodies
5. Melting of Ice caps in Arctic and Antarctic regions

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6. More cloud formation in the atmosphere
7. Shorter and warmer winters coupled with longer and hotter summers
8. Changes in rainfall pattern
9. Rise in sea level
10. Flooding and submergence of low lying coastal areas
11. Disruption in farming
12. More drought
13. Impact on plants, animals and humans

Control and remedial measures

1. Reduction in consumption of fossil fuels such as coal and petroleum
2. Use of bio-gas plants
3. Use of nuclear power plants
4. Increasing forest cover
5. Use of unleaded petrol in automobiles
6. Installation of pollution controlling devices in automobiles (catalytic converter) and industries (Electro Static Precipitators, Bag filters, Wet scrubbers etc.)

Effects of High Altitude and Mountain Air on Health

It is a pathological effect of high altitude on humans, caused by acute exposure to low partial pressure of oxygen at high altitude. It commonly occurs above 2,400 metres (8,000 feet). It presents as a collection of non-specific symptoms, acquired at high altitude or in low air pressure, resembling a case of "flu, carbon monoxide poisoning or a hangover". It is hard to determine who will be affected by altitude sickness, as there are no specific factors that correlate with a susceptibility to altitude sickness. However, most people can ascend to 2,400 metres (8,000 ft) without difficulty.

Acute mountain sickness can progress to high altitude pulmonary oedema (HAPE) or high altitude cerebral oedema (HACE), which are potentially fatal. Chronic mountain sickness, also known as Monge's disease, is a different condition that only occurs after very prolonged exposure to high altitude.

The altitudes ranging from 9,000 to15,000 feet above sea level. Travelling to this altitude in a short time can lead to acute health problems. Acute mountain sickness is commonly manifested as headache and vomiting. Other symptoms include breathlessness, sleeplessness and cough. Sudden induction to such high altitude has profound effect on the body. It can lead to hypertension, blood coagulation disorders (intravascular blood coagulation, thrombo-embolism) and pulmonary hypertension. The risk of high altitude illness depends on how quickly one ascends to high altitude. The recommendation is that one can safely ascend from sea level to 8,000 feet above sea level in 24 hours.

Symptoms

1. Severe Breathlessness
2. Headache
3. Vomiting
4. Ataxia
5. Staggering gait (like drunk)
6. Sleepiness
7. Unconsciousness
8. Pain abdomen
9. Visual Disturbances

Water

Syllabus- Water : Safe and wholesome water and water requirements. Properties of water from different sources. Water pollution and health hazards. Contemporary and Ayurvedic methods of water purification. Hard Water - its effects on health and methods of removal of hardness. Quality of water stored in different vessels as per classics. Rain water harvesting - methods and its importance.

Learning objectives- 1. Explain safe and wholesome water and state water requirements. 2. Explain the properties of water from different sources. 3. Explain water pollution and health hazards. 4. Describe the contemporary methods of water purification along with Ayurvedic methods. 5. Elucidate the effects of Hard Water on health and methods of removal of hardness. 6. Describe the quality of water stored in different vessels as per classics. 7. Explain the rain water harvesting methods and its importance.

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Water is one of the most vital natural resources for all life on earth. The availability and quality of water always have played an important part in determining not only where people can live, but also their quality of life. Even though there always has been plenty of fresh water on earth, water has not always been available when and where it is needed, nor is it always of suitable quality for all uses. Water must be considered as a finite resource that has limits and boundaries to its availability and suitability for use.

Safe and readily available water is important for public health, whether it is used for drinking, domestic use, food production or recreational purposes. Improved water supply and sanitation, and better management of water resources, can boost countries economic growth and can contribute greatly to poverty reduction.

Water is as essential to the life as air, deprivation of it will kill person earlier than deprivation of food, human body contain water about 60-70 per cent of its total weight. It as an essential constitution of living cell, all the tissues and organs contain water, this quantity varying from time to time.

Jala Paryaya-(Synonyms of Water)

पानीयं सलिलं नीरं कीलालं जलमम्बु च।
आपो वार्वारि कं तोयं पयः पाथस्तथोटकम॥
जीवनं वनमम्भोऽर्णोऽमृतं घनरसोऽपि च॥
(भा.प्र. वारिवर्ग)

Paniya, Salila, Nira, Kilala, Jala, Ambu, Apa, Vara, Vari, Ka, Toya, Paya, Patha, Udaka, Jivana, Vana, Ambha, Arna, Amruta, Ghanasara are synonyms of water.

Classification of Jala

पानीयं मुनिभिः प्रोक्तं दिव्यं भौममिति द्विधा।
(भा.प्र. वारिवर्ग)

According to Sushrutacharya and Bhavamishra - Antariksha Jala or Divya (Rain Water) and Bhauma Jala (Ground Water).

1. Antariksha Jala (Rain Water)

पानीयमान्तरीक्षमनिर्देश्यरसममृतं जीवनं तर्पणं धारणमाश्वासजननं श्रमक्लमपिपासामदमूर्च्छातन्द्रानिद्रादाह-प्रशमनमेकान्ततः पथ्यतमं च॥ (सु.सू. 45/3)

शीतं शुचि शिवं मृष्टं विमलं लघु षड्गुणम।
प्रकृत्या दिव्यमुदकं...॥
(च.सू. 27/198)

जीवनं तर्पणं हृद्यं ह्लादि बुद्धिप्रबोधनम।
तन्वव्यक्तरसं मृष्टं शीतं लघ्वमृतोपमम॥
(सूर्यांदधृतप्रमुक्तत्वाल्लघु वातकफापहम।
शैत्यजीवनसौम्यत्वैः पित्तरक्तविषर्तिजित॥
(अ.हृ.सू. 5/1, अ.स.सू. 6/3-4)

Rain water is having taste which is not clearly manifest, is like Amruta(nectar), Jeevan, Tarpana, Dharana (supporting life and comforting the body), relieves fatigue, exhaustion, thirst, toxicity, fainting, Stupor, sleepiness, burning sensation, conquers the abnormal Vata and Kapha and especially suitable for health.

Types of Antariksha Jala

दिव्यं चतुर्विधं प्रोक्तं धाराजं करकाभवम॥
तौषारञ्च तथा हैमं तेषु धारं गुणाधिकम॥
(भा.प्र. वारिवर्ग)

तत्रान्तरीक्षंचतुर्विधम। तद्यथा–धारं, कारं, कौषारं, हैममिति। (सु.सू. 45/7)

Antariksha Jala four types

1. Dhara (falling)
2. Kara (water from hailstones)
3. Taushara (water from dew)
4. Haima (water from melting of snow)

Dhara Jala of two types

धाराजलं च द्विविधं गाङ्गसामुद्रभेदतः। (भा.प्र. वारिवर्ग)

1. Ganga
2. Samudra Jala

Ganga Jala is rain water usually falling in Ashvayuja month (mid-September-mid October).

2. Bhauma Jala (ground water)

Bhauma Jala is divided into three kinds Jangal, Anupa, Sadharana.

According to Bhavamishra Varivarga 6/25-31

Jangala Desha Jala- Which is very little water, small sized trees and people who suffering from

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diseases of Pitta and Rakta. This causes dryness, salty, easy for digestion, mitigates Pitta, increases digestive fire, mitigates many diseases of Kapha origin and good for health

Anupa Desha Jala- there is plenty of water, big sized and people suffering from diseases of Vata and Kapha. This causes accumulation of more moisture inside sweet, unctuous, thick and heavy for digestion, destroys digestive fire, increases Kapha and causes diseases Kapha and good for heart.

Sadharana Desha Jala- mixture of the both features. Causes sweetness, increases digestive fire, cold in potency, easy for digestion, is nourishing, helps taste, relieves thirst, burning sensation, and mitigates all three Doshas.

ततसर्वकालमुपयुञ्जीत, तस्यालाभेभौमम। तच्चौकाश-गुणबहुलम। ततपुनः सप्तविधम। तद्यथा–कौपं, नादेयं, सारसं, ताडागं, प्रास्त्रवणम, औद्भिदं, चौण्ट्यमिति॥ (सु.सू. 45/7)

कौपसारसताडागचौण्डप्रास्त्रवणौद्भिदम ।
वार्षानदीतोयमिति तत पुनः स्मृतमष्टधा॥
(अ.स.सू. 6/7)

Bhouma Jala- Seven types

1. Kaupa (well)
2. Nadeya (river)
3. Sarasa (natural lake)
4. Tadaga (Artificial lake)
5. Prasravana (waterfalls)
6. Audbhida (springs)
7. Cauntya (step well)
8. Vapi (well) according to Vagbhatacharya.

सक्षारं पित्तकृत्कौपम् दीपनम् नातिवातलम।
सारसं स्वादु लघु च ताटाकं गुरु वातलम॥
चौण्ड्यं तु पित्तलं दोषहरं प्रास्त्रवणोदकम।
औद्भिदं स्वादु पित्तघ्नं स्वादु वार्षाजलं लघु॥
नादेयं वातलं रूक्षं कटुकं च तथाऽदिशेत।
धन्वानूपमहीध्राणां सामीप्याद गुरुलाघवम॥
(अ.स.सू. 6/7)

Kupa- alkaline and increases Pitta and digestive power and hence does not increase Vata much.

Sarasa- light, sweet.

Tadaga- Heavy, increases Vata.

Caunda- increases Pitta

Prasravana – normalizes all Doshas

Audbhida- sweet and normalizes Pitta.

Vapi- sweet and light

Nadeya- increases Vata, dry and Katu Rasa.

लोहितकपिलपाण्डुनीलपीतशुक्लेष्ववनिप्रदेशेषुमधुराम्ललवण-कटुतिक्तकषायाणियथासङ्ख्यमुदकानिसंभवन्ति इत्येकेमाषन्ते॥
(सु.सू. 45/5)

Rain water falling on the ground which is red, brown, white, yellowish –white, blue, yellow, and white coloured soiled will be having tastes such as Madhura, Amla, Lavana, Katu, Tikta, Kashaya respectively.

तत्र वर्षास्वान्तरिक्षमौद्भिदं वा सेवेत, महागुणत्वात; शरदि सर्वं, प्रसन्नत्वात; हेमन्ते सारसं ताडागं वा; वसन्ते कौपं प्रास्त्रवणं वा; ग्रीष्मेऽप्येवं; प्रावृषि चौण्ट्यमनभिवृष्टं सर्वं चेति। (सु.सू. 45/8)

During Varsha Rutu, atmospheric water or water from spring may be used, because of their profound good qualities, during Sarada Rutu all kind of water may be used because of being clear free from contamination, during Hemanta Rutu water of either natural lake or artificial lake may be used, during Grishma Rutu also same manner, during Pravruta Rutu water collected in burrow and all other kinds which are not rain may be used.

Safe and Wholesome Water

निर्गन्धमव्यक्तरसं तृष्णाघ्नं शुचि शीतलम।
अच्छं लघु च हृद्यं च तोयं गुणवदुच्यते॥
(सु.सू. 45/20)

जीवनं तर्पण हृद्यं ह्लादि बुद्धिप्रबोधनम।
तन्वव्यक्तरसं मृष्टं शीतं लघ्वमृतोपमम॥
(अ.ह.सू. 5/1)

अगन्धमव्यक्तरसं सुशीतं तर्षनाशनम।
स्वच्छं लघु च हृद्यञ्च तोयं गुणवदुच्यते॥
(भा.प्र. वारिवर्ग)

Water which has Agandha (no smell), Avyakta Rasa (no prominent taste), Trishnaghna (quenches thirst), Shuchi (clean), Shitala (cold), Laghu (light -easy for digestion) and Hrudya (pleasing to the

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mind) is said to the best in qualities or suitable water for drinking.

Water intended for human consumption should be both safe and wholesome. This has been defined as water that is,

a. Free from pathogenic agents
b. Free from harmful chemical substances
c. Pleasant to the taste, i.e. free from color and odor
d. Usable for domestic purpose

Contaminated / Impotable Water

Water is said to be polluted or contaminated when it does not fulfill the above criteria.

पिच्छिलं कृमिलं क्लिन्नं पर्णशैवालकर्दमैः।
विवर्णं विरसं सान्द्रं दुर्गन्धं न हितं जलम॥
(भा.प्र. वारिवर्ग)

कीटमूत्रपुरिषाण्डशवकोथप्रदूषितम्।
तृणपर्णोत्करयुतं कलुषं विषसंयुतम॥
योऽवगाहेत वर्षासु पिबेद्वाऽपि नवं जलम।
स बाह्याभ्यन्तरान रोगान प्राप्नुयात क्षिप्रमेव तु॥
(सु.सू. 45/9)

कीटाहिमूत्रविट्कोथतृणजालोत्करविलम्।
पड्कपड्कशैवालहठपर्णादिसंस्तृतम्।
सूर्येन्दुपवनादृष्टं जुष्टं च क्षुद्रजन्तुभिः।
अभिवृष्टं विवर्णञ्च कलुषं स्थूलफेनिलम।
(अ.स.सू. 6/9)

Water is slimy, with worm, unctuous, contaminated with leaves, algae, slug etc. with various colors, with excreta or urine, ova, dead bodies of animals, petrified, accumulation of grass, bad taste, and bad smell. Which is dirty or containing poisonous, or who drink fresh water in during Varsha Rutu will gets affected by both external and internal diseases quickly.

Dushita Jala (Shad Doshayukta)

तत्र यत पड्कशैवालहठतृणपद्मपत्रप्रभृतिभिरवच्छन्नं रविशशिकिरणनिलैर्नाभिजुष्टं गन्धवर्णरसोपसृष्टं तद्यापन्नमिति विद्यात। तस्य स्पर्शरुपरस गन्धवीर्यविपाकदोषाः षट संभवन्ति। तत्र, खरता पैच्छिल्यमौष्ण्यं दन्तग्राहिता च स्पर्शदोषः पर्क सिकताशैवालबहुवर्णता रुपदोषः व्यक्तरसता रसदोष; अनिष्टगन्धता गन्धदोष; यदुपयुक्तंतृष्णागौरवशूल-कफप्रसेकानापद्यति स वीर्य दोषः यद्युपयुक्तं चिराद्विपच्यते वीष्टम्भयति रा स विपाकदोष इति। (सु.सू. 45/11)

Water which is covered over with slush, algae, weed, grass, leaves of lotus etc. which is not exposed to rays of sun and moon and air, which is having odour, color, and taste very prominently, should be understood as polluted. Its blemishes will be of six kinds- such as of touch, sight, taste, odour, potency, and taste after digestion, roughness, sliminess, warmth, producing tingling of the teeth are blemishes of touch, presence of slush, sand, algae and many colors are blemishes of sight; prominence of taste is the blemish of taste, unpleasant odour is the blemish of smell, producing thirst, feeling of heaviness, abdominal pain, more elimination of Kapha from the mouth etc. are blemishes of potency; getting digested after a long time or causing constipation are the blemishes of taste after digestion. These blemishes are not present in atmospheric water (pure water).

Water Requirements

The basic physiological requirements for drinking water have been estimated at about two litres per head per day. This is just for survival. But from the standpoint of public health and improvement of the quality of life, water should be provided in adequate volume. It helps to reduce the incidence of many water related diseases among the people most at risk. The consumption of water, however, depends upon climate condition, standard of living and habits of the people.

A daily supply of 150-200 litres per capita is considered as an adequate supply to meet the need for all urban domestic purpose. In India 40 litres of water supply per capita per day was the set target to be achieved in rural areas.

Uses of Water

पानीयं प्राणिनां प्राणा विश्वमेव च तन्मयम।
अतोऽत्यन्तनिषेधेऽपि न क्वचिद्वारि वार्यते॥
आस्यशोषाङ्गसादाद्या मृत्युर्वा तदलाभतः।
न हि तोयाद्विना वृत्तिः स्वस्थस्य व्याधितस्य च॥
(अ.स.सू. 6/11)

Water is the supporter of life of all living creatures; whole world is filled with it; hence even

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in prohibited condition also, water is not fully prohibited; non availability of water leads to dryness of mouth, weakness and pain of body, or even death. There is no existence and acidity without water even for a healthy or diseases person.

The uses of water in a community are many, and the requirement in quantity and quality are varied. Conventionally, it has been convenient and economical to provide a single water supply sufficient in quantity to serve all uses and suitable in quality to meet drinking requirements.

1. **Domestic use-** on domestic front, water is required for drinking, cooking, washing and bathing, flushing of toilets, gardening etc.
2. **Public purpose-** cleaning streets, recreational purpose like swimming pools, public fountains and ornamental ponds, fire protection and public parks.
3. **Industrial purpose-** for processing and cooling
4. **Agricultural purpose-** irrigation
5. **Power production-** from hydropower and steam power
6. Carrying away waste from all manner of establishment and institutions.
7. Water is essential factors in the economic, social and cultural development of the community. It can eliminate diseases, promote rural development and improve quality of life.

Sources of Water Supply

Water may be abstracted for use from any one of a number of points in its movement through the hydrological cycle. Generally, water sources must conform to two criteria

a. Quantity must be sufficient to meet present and future requirement.

b. The quality of water must be acceptable.

Source of water-

1. Rain
2. Surface water-
   a. Impounding reservoirs
   b. Rivers and streams
   c. Tanks, ponds and lakes
3. Ground water-
   a. Shallow wells b. Deep wells
   c. Springs

1. Rain : Rain is the prime source of all water. Apart of the rain water sinks into the ground to from ground water, a part of it evaporates back into the atmosphere and some runs off to form streams and rivers which flow ultimately into the sea.

पानीयमान्तरीक्षमनिर्देश्यरसममृतं जीवनं तर्पणं धारणमाश्वासजननं श्रम क्लम पिपासा मद मूर्च्छा तन्द्रा निद्रादाहप्रशमनमेकान्ततः पथ्यतमं च ॥ (सु.सू. 45/3)

Rain water is having taste which is not clearly manifest, is like Amruta (nectar), Jeevan, Tarpana, Dharana (supporting life and comforting the body), relieves fatigue, exhaustion, thirst, toxicity, fainting, Stupor, sleepiness, burning sensation, conquers the abnormal Vata and Kapha and especially suitable for health.

Characteristics of rain water

1. Rain water is the purest water in nature.
2. Physically- it is clear, bright and sparkling.
3. Chemically- it is very soft water containing only traces of dissolved solids (0.0005 per cent). Being soft it has a corrosive action on lead pipes.
4. Bacteriologically- rain water from clean districts is free from pathogenic agents.

Impurities- it picks up suspended impurities from atmosphere such as dust, soot and micro-organisms and gases such as carbon dioxide, nitrogen, oxygen and ammonia. Gaseous sulphur and nitrogen oxides are emitted from power plants that use fossils fuels. These gases react with atmospheric water, forming dilute solution of sulphuric and nitric acid.

2. Surface water : Surface water originates from rain water. It is the main source of water supply in many areas. Examples of surface water include rivers, tanks, lakes, wadies, man-made reservoirs and sea water. Surface water is prone to contamination from human and animal's source.

The vast majority of Indian cities and town depend upon surface water source which are :

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Impounding reservoirs -

- Rivers and streams
- Tanks, ponds, and lakes

1. Impounding reservoirs : These are artificial lakes constructed usually of earthwork or masonry in which large quantities of surface water is stored. Dams built across rivers and mountains streams also provide large reserves of surface water.

Catchment area- the area draining into the reservoir is called catchment area. Mumbai, Chennai and Nagpur derive their water supply from impounding reservoirs.

Disadvantages – storing water for long periods in reservoirs is the growth of algae and other microscopic organisms, which impart bad tastes and odours to water.

Characteristics- impounding reservoirs usually furnish a fairly good quality of water. The water is usually clear, palatable and ranks next to rain water in purity. If the surrounding hills are covered with peat, the water may acquire a brownish coloration. The water is usually soft and considered to be free of pathogenic organisms.

2. Rivers-

नादेयमुदकं रुक्षं वातलम् लघु दीपनम।
अनभिष्यन्दि विशदं कटुकं कफपित्तनुत॥
(भा.प्र. 6/29)

River water causes dryness, increases Vata, easy for digestion, increases digestive fire, not cause accumulation of more moisture inside, viscid, pungent and mitigates Kapha and Pitta.

Many rivers furnish a dependable supply of water. Cities such as Delhi, Kolkata and Allahabad rely on river water for their needs.

Characteristics- river water is turbid during rainy season; it may be clear in other seasons. Clarity of water is no guarantee for its purity. River water contains dissolved and suspended impurities of all organisms.

Impurities- River is direct connection between the alimentary canal of a people living upstream and the mouth of those below. Surface washings, sewage and sullage water, industrial and trade wastes, and drainage from agricultural areas. The customs and habits of the people like bathing, animals washing, and disposal of the dead bodies contaminates the river water.

Purification- self-purification does occur in river water by natural forces of purification such as dilution, sedimentation, aeration, oxidation, sunlight, plant and animal's life but these agencies are not sufficient to render the water potable. River water needs purification before it can be used for drinking purpose.

According to Sushruta Sutra Sthana-45/21

Water of rivers which flow

- Westward is healthy because of lightness;
- Eastward is not ideal because heaviness,
- Southwards do not increase the Doshas.
- Water of river arising from,
- Sandhya - leprosy
- Vindhya - worm infections
- Mahendra - Filariasis, abdominal enlargement (Udararoga)
- Himalaya - heart diseases, dropsy, diseases of head, filiariasis and goitre.
- Pracya - (central Bengal north Orissa) and Avanti (round about city of Ujjain) and Aparavantya (Konkan) produces Arsha
- Pariyatra (western ranges of Vindya) are healthy, increases strength.

3. Tanks-

Vapya Jala- artificial tanks with step

पाषाणैरिष्टकाभिर्वा बद्धः कूपो बृहत्तरः।
ससोपानो भवेद्वापी तज्जलं वाप्यमुच्यते॥
वाप्यं वारि यदि क्षारं पित्तकृत्कफवातहृत।
तदेव मिष्टं कफकृद्वातपित्तहरं भवेत॥
(भा.प्र. 6/42-43)

A big large, deep, broad tank constructed with stones or bricks and having flights of steps is called Vapi. Water of artificial tank, if alkaline in taste, increases Pitta and mitigates Kapha and Vata, and if sweet, it increases Kapha and mitigates Vata and Pitta.

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Tanks are large excavations or depression in which surface water is stored. They are an important source of water supply in some Indian villages. They are full of silt and colloidal matter, especially immediately after the rains. The older tanks may be full of aquatic vegetation. Tanks are used for washing of cloths, cattle, humans, cooking pots, children use it for swimming and there may be regular defecation around the edges which will be washed into the tank at next rains.

Improvement of tanks

1. The edges of tanks should be elevated in order to prevent the entry of surface washings,
2. There should be a fence around the tank to prevent access to animals,
3. No one should be permitted to get into the tank directly,
4. There should be an elevated platform from where people can draw water
5. The weeds should be periodically removed
6. The tank should be cleaned at the end of the dry season.

Sea Water

Though this source is plentiful, it has great many limitations. It is contains 3.5 per cent of salt in solution.

Salt concentration - 30-36 gm per litre

Chloride - 19 gm per litre

Sodium - 10.6 gm per litre

Magnesium - 1.27 gm per litre.

It is adopted in places where sea water is the only source available.

4. Ground water : Rain water percolating into ground constitutes ground water. Water used by humans comes mainly from land. Ground water is the cheapest and most practical means of providing water to small communities. Ground water is superior to surface water, because the ground itself provides an effective filtering medium.

Advantage

1. It is likely to be free from pathogenic agents.
2. It usually requires no treatment.
3. The supply is likely to be certain even during dry season.
4. It is less subject to contamination than surface water.

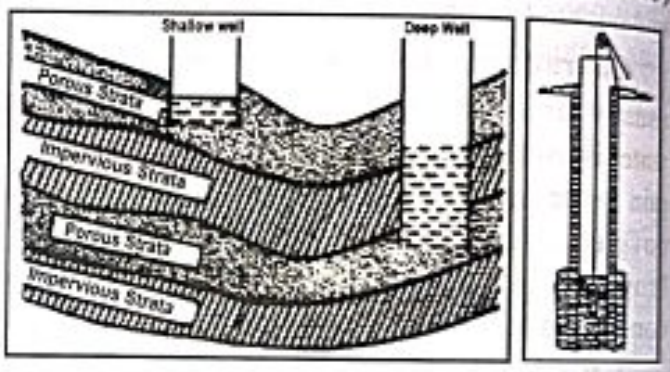
Disadvantages

1. It is high in mineral content e.g. salts of calcium and magnesium which render the water hard.
2. It requires pumping or some arrangement to lift the water.

Kaupa Jala (Wells)

भूमौ खातोऽल्पविस्तारो गम्भीरो मण्डलाकृति।
वद्धोऽबद्धः स कूपः स्यातदम्भः कौपमुच्यते॥
कौपं पयो यदि स्वादु त्रिदोषघ्नं हितं लघु।
तत्क्षारं कफवातघ्नं दीपनं पित्तकृत्परम॥

(भा.प्र. 6/44-45)



Shallow well and Deep well Sanitary well

A pit dug in the ground, small in breadth, deep and round, built or not built known as Kupa. Water of deep well is sweet, mitigates all three Doshas, good for health, and easy for digestion, and if alkaline in taste, it mitigates Kapha and Vata, increases Pitta and augments digestive fire.

Traditionally wells are an important source of water supply. Even today, they are an important source of water supply in many communities.

Technically, wells are of two kinds-

Shallow wells : Shallow wells tap subsoil water i.e. the water from above the first impervious layer in the ground. They yield limited quantities of water, and the water is notoriously liable to pollution unless care is taken in well construction.

Deep wells : A deep well is one which taps water from the water-bearing stratum below the first

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impervious layer in the ground. Deep wells are usually machine–dug and may be several hundred meters deep. Deep wells furnish the safest water, and are often the most satisfactory source of water supply.

Difference between a Shallow Well and Deep Well

	Shallow well	Deep well
Definition	Taps the water from above the first impervious layer	Taps the water from below the first impervious layer
Chemical quality	Moderately hard water	Much hard water
Bacteriological quality	Often grossly contaminated	Taps purer water
Contamination	Liable for contamination	Non-liable for contamination
Yield	Usually goes dry in summer	Provides a source of constant supply
Cost	Easy and cheap to construct	Difficult and cost to construct

Artesian wells : It is a kind of deep wells in which the water rises above the level of ground water, because it is held under pressure between two impervious strata. Artesian wells are not common in India.

Well may be classified, according to the method of construction, into

- Dug wells
- Tube wells.

Dug wells- Dug well are by far the commonest types in India. Two types of dug well exist in our rural areas,

Katch well- It is hole dug into the water bearing stratum

Pucca well- It is an open well, built of brick or stones.

Step well- Steps well are a kind of Pucca wells which are becoming obsolete, fortunately. Steps well are constructed into these wells to enable people to descend into the well to fetch water. In these well, there is considerable personal contact between the user and the water.

Sanitary Well

A sanitary well is one which is properly located, well constructed and protected against contamination with view to yield a supply of safe water.

Location- Well should be located not less than 15 meter (50feet) from source of contamination. The well should be located at a high of the users should be her elevation with respect to a possible source of contamination. The distance between well and houses of users should be considered. No user will have to carry water for more than 100 meters.

Lining- It should be built of bricks or stone set in cement up to a depth of at least 6 meters, so that water enters from the bottom and not from sides of the well.

Parapet- There should be a parapet wall up to a height of at least 70-75 cms above the ground.

Platform- It should be a cement concrete platform round the well extending at least 1 meter in all direction with gentle slope outwards towards a Pucca drain built along its edges.

Drain- There should be a Pucca drain to carry off spilled water to a public drain or a soakage pit constructed beyond the "cone of filtration" of the well.

Covering- The top of the well should be closed with cement concrete because the bulk of the pollution is produced into the well directly through the open top.

Hand Pump- The well should be equipped with a hand pump for lifting the water in a sanitary manner.

Consumer responsibility- strict cleanliness should be enforced. Personal ablutions, washing of cloths and animals, dumping of refuse and wastes should be prohibited. Ropes and buckets from individual homes should not be used for drawing a supply from well. Water from the well should be carried in clean sanitary vessels to individual houses.

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Quality- The physical, chemical and bacteriological quality of water should conform to the acceptable standards of quality of safe and wholesome water.

Tube well

Tubes well are successful as a source of drinking water in many parts of India. They yield water which is bacteriological safe and are also cheap in comparison to other source of supply. The tube well consists of pipe usually galvanized iron sunk into water bearing stratum and fitted with a strainer at the bottom and a hand pump at top. A water tight concrete platform with a drain all around should be provided. The area within 15 meter of the tube well should keep free from pollution with liquid and solid wastes. The hand pump should kept in good repair. The life of tube well is not the same everywhere. An average well may last for period of 5 to 10 years.

Springs (Audbhida Jala)

विदार्य भूमिं निम्नां यन्महत्या धारया स्रवेत।
तत्तोयमौद्भिदं नाम वदन्तीति महर्षयः॥
औद्भिदं वारि पित्तघ्नमविदाह्यतिशीतलम।
प्रीणनं मधुरं वल्यमीषद्वातकरं॥

(भा.प्र. 6/34-35)

Water which comes out in a big stream bursting the ground is called Audbhida Jala. This water mitigates Pitta, does not causes heart burn, very cold in potency, enlivening, sweet, strengthen, increases Vata slightly and is easily digestible.

When ground water comes to the surface and flow freely under natural pressure, it is called a "spring". Spring may be of two types,

Shallow spring- dry up quickly during summer months.

Deep spring- do not show seasonal fluctuation in the flow of water

Springs are simpler to exploit, as no pumping is needed to bring the water to the surface.

Water Pollution

Pure uncontaminated water does not occur in nature. It contains impurities of various kinds- natural and man-made.

Impurities- Dissolved gases- nitrogen, carbon dioxide, hydrogen sulphide etc.

Dissolve minerals- salt of calcium, magnesium, sodium etc.

Impurities- Suspended- clay, silt, sand and mud and microscopic organism.

Water pollution is caused by human activity. urbanization and industrialization.

Sources of water pollution

a) **Sewage-** which contain decomposable organic matter and pathogenic agents.

b) **Industrial and trade wastes-** which contain toxic agents ranging from metal salts to complex synthetic organic chemicals.

c) **Agricultural pollutants-** which comprise fertilizers and pesticides

d) **Physical pollutants-** thermal and radioactive substances.

Water related diseases

A. Biological water borne diseases-

Viral- Viral hepatitis A, hepatitis E, poliomyelitis, rotavirus diarrhoea in infants.

Bacterial- Typhoid and paratyphoid fever, bacillary dysentery, Esch. Coil diarrhoea, cholera.

Protozoal –amoebiasis, giardiasis

Helminthic- roundworm, threadworm, hydatid disease.

Laptospiral-weil's disease

Snail-schistosomiasis

Cyclops- guinea worm, fish tape worm.

B. Chemical- Chemical pollutants of diverse nature derived from industrial and agricultural wastes are increasingly finding their way into public water supplies. These pollutants include detergent solvents, cyanides, heavy metals, minerals and organic acids, nitrogenous substances, bleaching agents, dyes, pigments, sulphides, ammonia, toxic and biocidal organic compounds great variety. Chemical pollutants may affect man's health not only directly, but also indirectly by accumulating in aquatic life used as human food.

Dental health- The presence of fluoride at about 1 mg/ litre in drinking water is known to protect

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against dental caries, but high levels of fluoride causes mottling of the dental enamel.

Cyanosis in infants- high nitrate content of water is associated with methaemoglobinaemia. This is a rare occurrence but may occur when surface water from farm land, treated with fertilizer.

Cardiovascular diseases-because of hardness of water.

Some diseases are transmitted because of inadequate use of water like shigellosis, trachoma and conjunctivitis, ascariasis, scabies.

Some diseases are related to the disease carrying insects breeding in or on near water like: malaria, filarial etc.

Purification of Water

Purification of water is of great importance in community medicine. It may considered under two headings

1. Purification of water on a large scale
2. Purification of water on a small scale

Purification of Water on A Large Scale

The method of treatment to be employed depended upon the nature of raw water and the desired standards of water quality. For example ground water (well and spring) may need no treatment, other than disinfection. Surface water (river and lake water) which tends to be turbid and polluted requires extensive treatment.

The components of typical water purification-

1. Storage 2. Filtration 3. Disinfection

1. Storage- Natural purification and we may look at it from three points-

A. Physical- By mere storage, the quality of water improves. About 90 per cent of the suspended impurities settle down in 24 hours by gravity. The water becomes clearer. This allows penetration of light, and reduces the work of the filters.

B. Chemical- Certain chemical changes also take place during storage. The aerobic bacteria oxidize the organic matter present in the water with the aid of dissolved oxygen.

C. Biological – A tremendous drop takes place in bacterial count during storage. The pathogenic organisms gradually die out. It is found that when river water is stored the total bacterial count drops by as much as 90 per cent in the first 5-7 days. This is the one of the greatest benefits of storage. The optimum periods of storage of river water is considered to be about 10-14 days. If the water is stored for long duration, there is development of vegetable growth such as algae which impart a bad smell and color to water.

2. Filtration- Filtration is the second stage in the purification of water and quite an important stage because 98-99 per cent of bacteria are removed by filtration, apart from other impurities.

Two types of filters are use :

1. Slow sand or Biological filters
2. Rapid sand or Mechanical filters

Slow Sand or Biological Filter

Slow sand filters were first used for water treatment in 1804 in Scotland designed by John Gibb and subsequently in London. Slow sand filtration is a type of centralized or semi-centralized water purification system. A well-designed and properly maintained slow sand filter (SSF) effectively removes turbidity and pathogenic organisms through various biological, physical and chemical processes in a single treatment step. Only under the prevalence of a significantly high degree of turbidity or algae-contamination, pre-treatment measures (e.g. sedimentation) become necessary. Slow sand filtration systems are characterized by a high reliability and rather low lifecycle costs. Moreover, neither construction nor operation and maintenance require more than basic skills. Hence, slow sand filtration is a promising filtration method for small to medium-sized, rural communities with a fairly good quality of the initial surface water source. As stated by the WHO, slow sand filtration provides a simple but highly effective and considerably cheap tool that can contribute to a sustainable water management system.

Elements of a slow sand filter

1. Supernatant water
2. A bed of graded sand

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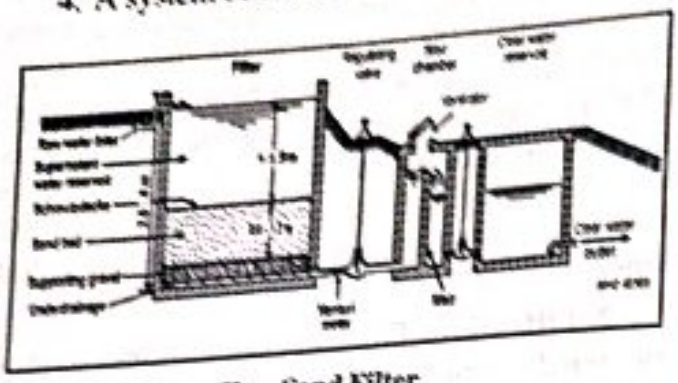
3. An under-drainage system
4. A system of filter control valves

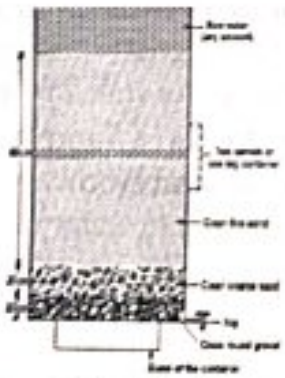


Slow Sand Filter

1. **Supernatant water-** The supernatant water above the sand bed, whose depth varies from 1 to 1.5 metre, serves two important purpose; it provides a constant head of water so as to overcome the resistance of the filter bed and thereby promote the downward flow of water through the sand bed; and secondly, it provides waiting period of some period of some hours (3 to 12 hours, depending upon the filtration velocity) for the raw water undergo partial purification by sedimentation, oxidation and particle agglomeration. The level of supernatant water is always kept constant.

2. **Sand bed-** The most important part of the filter is the sand bed. The thickness of sand bed about 1 meter. The sand grains are carefully chosen so that they are preferably rounded and have an "effective diameter" between 0.2 to 0.3 mm. The sand should be clean and free from clay and organic matter. The sand bed is supported by a layer of graded gravel 30-40 cm deep which also prevent the fine grains beings carried into the drainage pipes.

The sand bed presents a vast surface area one cubic meter of filter sand presents some 15,000 sq. meter of surface area. The designed rate of filtration of water normally lies between 0.1 and 0.4 m^3 per hour per square meter of sand bed surface.



Sand bed

Vital layer/ Zoogleal / Schmutzdecke / biological layer – When the filter is newly laid, it acts merely as a mechanical strainer, and cannot truly be considered as "biological". But very soon, the surface of sand bed gets covered with slimy growth known as "Schmutzdecke", vital layer, Zoogleal layer or biological layer. This layer is slimy and gelatinous and consists of threadlike algae and numerous forms of life including plankton, diatoms, and bacteria. The formation of vital layer is known as "ripening" of the filter. It may take several days for the vital layer to form fully, and when fully formed it extended for 2 to 3 cm into the top portion of sand bed. The vital layer is the "heart" of the slow sand filter. It removes organic matter, holds back bacteria and oxidizes ammonical nitrogen into nitrates and helps in yielding bacteria-free water. Until the vital layer is fully formed, the first few day filtrates is usually run waste.

3. **Under-drainage system :** At the bottom of the filter bed is the under – drainage system. It consists of porous or perforated pipes which serve the dual purpose of providing an outlet for filtered water, and supporting the filter medium above. Once the filter bed has been laid, the under-drainage system cannot be seen.

Filter box- The first three elements (supernatant water, sand bed and under drainage system) are contained in the filter box. The filter box is an open box, usually rectangular in shape, from 2.5 to 4 metres deep and built wholly or partly below ground. The walls may be made of stone, brick or cement. The filter box consists from top to bottom:

Supernatant water	1 to 1.5 metre
Sand bed	1.2 metre
Gravel support	0.30 metre
Filter bottom	0.16 metre

4. **System of filter control valves :** The filter is equipped with certain valves and devices which are incorporated in the outlet–pipe system. The purpose of devices is to maintain a constant rate of filtration. An important component of regulation

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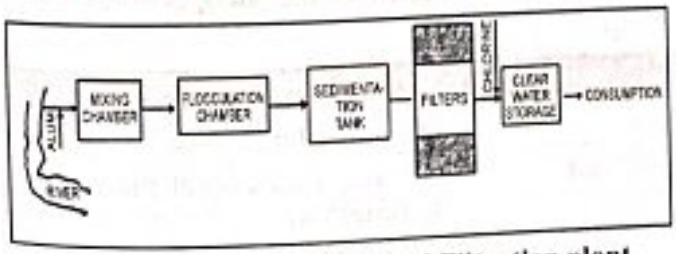
system is the "Venturi meter" which measures the bed resistance or "loss of head". When the loss of head exceeds 1.3 metre it is uneconomical to run the filter.

Filter cleaning- normally the filter may run for weeks or even month without cleaning. When the bed resistance increases to such an extent that the regulating valve has to be kept fully open, it is time to clean the filter bed, since any further increase in resistance is bound to reduce the filtration rate. At this stage, the supernatant water is drained off, and sand bed is cleaned by 'scraping' off the top portion, and say 20 or 30 scarping, the thickness of send bed will have reduced to about 0.5 to 0.8 metre. Then the plant is closed down and a new bed is constructed.

Advantages

1. Simplicity of design (simple and cheap construction)
2. Cost of constriction is cheaper than rapid sand filters. (Construction with local material and knowledge)
3. Very effective removal of most contaminants
4. Slow sand filter have been shown to reduce total bacterial counts by 99.9 to 99.99 per cent and E. coli by 99 to 99.9 per cent.
5. Physical, chemical and bacteriologically quality of filtered water is very high
6. High self-help compatibility (simple operation and maintenance)
7. No electricity required
8. No chemicals involved

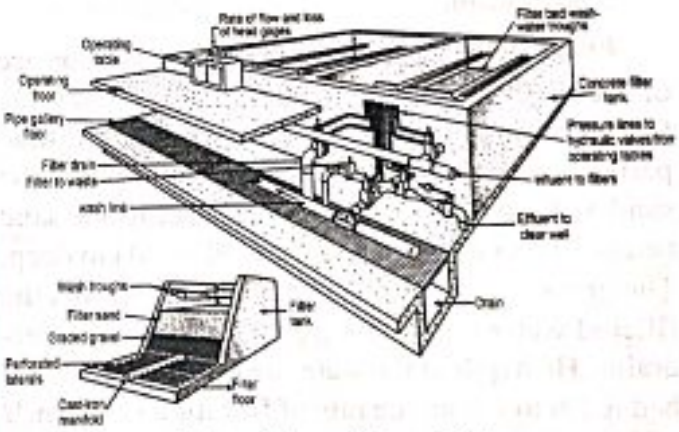
Rapid Sand or Mechanical Filters



Flow diagram of a Rapid Sand Filtration plant

Rapid sand filters evolved at the end of the 19th century in the United States and quickly gained popularity. Rapid sand filtration is a purely physical drinking water purification method. Rapid sand filters (RSF) provide rapid and efficient removal of relatively large suspended particles. Two types of RSF are typically used: rapid gravity (Paterson's filter) and rapid pressure sand filters (candy's filter). For the provision of safe drinking water, RSFs require adequate pre-treatment (usually coagulation-flocculation) and post-treatment (usually disinfection with chlorine). Both construction and operation is cost-intensive. It is a relatively sophisticated process usually requiring power-operated pumps, regular backwashing or cleaning and flow control of the filter outlet. Rapid sand filtration is common in developed countries for the treatment of large quantities of water where land is a strongly limiting factor, and where material, skilled labour, and continuous energy supply are available.

The following steps are involved in the purification of water by rapid sand filters:



A view of a rapid sand filter

1. **Coagulation-** The raw water is first treated with a chemical coagulant such as alum, the dose of which varies from 5-40 mg or more per liter, depending upon the turbidity and color, temperature and the pH value of the water.
2. **Rapid mixing-** The treated water is then subjected to violent agitation in a mixing chamber for few minutes. This allows a quick and thorough dissemination of alum throughout the bulk of the water, which is very necessary.

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3. **Flocculation-** The next phase involves a slow and gentle stirring of the treated water in a "flocculation chamber" for about 30 minutes. The mechanical type of flocculator is the most widely used. It consists of a number of paddles which rotate at 2 to 4 rpm. The paddles rotate with the help of motors. This slow and gentle stirring results in the formation of a thick, copious, white flocculent precipitate of aluminum hydroxide. The thicker the precipitate or flock diameter, the greater the settling velocity
4. **Sedimentation-** The coagulated water is now led into sedimentation tank where it is detained for period varying from 2-6 hours when the flocculent precipitate together with impurities and bacteria settle down in the tank. At least 95 per cent of flocculants precipitate needs to be removed before the water is admitted into the rapid sand filters.

5. Filtration-

Filter beds- each unit of filter bed has a surface of about 80-90 m^2 (about 900 sq. feet). Sand is the filtering medium. The "effective size" of sand particles is between 0.4-0.7 mm. The depth of the sand bed is usually about 1 meter. Below the sand bed is a layer of graded gravel, 30 to 40 cm deep. The gravel supports the sand bed and permits the filtered water to remove freely toward the under-drains. He depth of the water on the top of the sand bed is 1.0 to 1.5 m. the rate of filtration is 5-15m^3/m^2/hour.

Filtration- as filtration proceeds, the "alum-floc" not removed by sedimentation is held back on the sand bed. It forms a slimy layer comparable to the zoogleal layer in the slow sand filters. It adsorbs bacteria from the water and effect purification. Oxidation of ammonia also takes place during the passage of water through the filters. As filtration proceeds, the suspended impurities and bacteria clog the filters. The filters soon become dirty and begin to lose their efficiency. When the "loss of head" approaches 7-8 feet, filtration is stopped and the filters are subjected to a washing process known as "back washing".

Comparison of rapid and slow sand filters

Items	Rapid sand filter	Slow sand filer
Space	Occupies very little space	Occupies large area
Pre treatment	Coagulation, flocculation, and sedimentation	Not required except plain sedimentation
Effective size of sand	0.4 to 0.7 mm	0.2 to 0.3 mm
Rate of filtration	200 m. g. a. d.	2-3 m. g. a. d.
Operation	Not essential	Essential
Loss of head allowed	6-8 feet	4 feet's

Back washing

Rapid sand filters need frequent washing daily or weekly, depending upon the loss of head. Washing is accomplished by reversing the flow of water through the sand bed, which is called "backwashing". Back washing dislodges the impurities and cleans up the sand bed. The washing is stopped when clear sand is visible and the washing water is sufficiently clean. The whole process of back washing takes about 15 minutes. In some rapid sand filters compressed air is used as part of the back washing process.

Advantages

1. Rapid san filter can deal with raw water directly. No preliminary storage is needed
2. The filter beds occupy less space
3. Filtration is rapid, 40-50 times that of slow sand filter
4. Washing of filter is easy
5. There is more flexibility in operation.

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Washing	By Back washing	By scraping the sand bed
Removal of Turbidity	Good	Good
Removal of colour	Good	Fair
Removal of bacteria	98-99 per cent	99.9-99.99 per cent
Cost	High	Low
Cleaning interval	One to two days	Three to four months

Disinfection

Disinfection is an important step in ensuring that water is safe to drink. Water systems add disinfectants to destroy micro-organisms that can cause disease in humans. The surface water treatment rule requires public water systems to disinfect water obtained from surface water supplies or groundwater sources under the influence of surface water. Primary methods of disinfection are chlorination, chloramines, ozone, and ultraviolet light. Other disinfection methods include chlorine dioxide, potassium permanganate, and Nano-filtration.

Criteria's

a) It should be capable of destroys the pathogenic organisms present, within the contact time available and not unduly influence by the range of physical and chemical properties of water encountered particularly temperature, pH and mineral constituents.

b) Should be leave products of reaction which render the water toxic or impart color or otherwise make it unpotable.

c) Have ready and dependable availability at reasonable cost permitting convenient, safe and accurate application to water.

d) Possess the property of leaving residual concentration to deal with small possible recontamination.

e) Be amenable to detection by practical, rapid and simple analytical technique in the small concentration ranges to permit the control of the efficiency of the disinfection process.

Chlorination

Chlorination is one of the greatest advances in water purification. It is supplement, not a substitute to sand filtration. Chlorine kills pathogenic bacteria, but is has no effect on spores and certain viruses (e.g. polio, viral hepatitis) except in high doses. Apart from its germicidal effect, chlorine has several important secondary properties of value in water treatment: it oxidizes iron, manganese and hydrogen sulphide; it destroys some taste and odour producing constituents; it controls algae and some organisms and aids coagulation.

Mode of chlorine- Formation of hydrochloric and hypochlorous acids.

$H_2O + Cl_2$——HCl + HOCl.

HCl is neutralised by alkalinity of the in water

HOCl—— H + OCl.

The hypochlorous acid ionizes to form hydrogen ions and hypochlorite ions from HOCl. Chlorine acts best as a disinfectant when the pH of water is around 7 because of the predominance of hypochlorous acid. When the pH value exceeds 8.5 it is unreliable as disinfectant because about 90 per cent of the hypochlorous acid gets ionized to hypochlorite ions. It is fortunate that most waters have a pH value between 6-7.5.

Principles of chlorination

1. First of all, the water to be chlorinated should be clear and free from turbidity.
2. Chlorine demand of water should be estimated
3. Contact period- the presence of free residual chlorine for a contact period of at least one hour is essential to kill bacteria and viruses.
4. The minimum recommended concentration of free chlorine is 0.5 mg/liter for one hour.
5. The sum of the residual demand of the specific

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water plus the free residual chlorine of 0.5 mg/liter constitutes the correct dose of chlorine to be applied.

Methods of chlorination

For disinfecting large bodies of water, chlorine is applied either,

1. Chlorine gas
2. Chloramine
3. Perchloron

1. **Chlorine gas-** It is the first choice, because it is cheap, quick in action, efficient and easy to apply. Chlorine gas is an irritant to eyes and poisonous, special equipment known as chlorinating equipment is required. Paterson's chloronome is one such device for measuring, regulating and administering gaseous chlorine to water supplies.
2. **Chloramine-** Chloramine uses instead of chlorine gas. Chloramines are loose compounds of chlorine and ammonia. They have a less tendency to produce chlorinous tastes and give a more persistent type of residual chlorine. Drawback- slower action compared to chlorine gas.
3. **Perchloron/ high test hypochlorite (H.T.H.)-** It is a calcium compound which carries 60-70 per cent of available chlorine. Solutions prepared from H.T.H. are also used for water disinfection.

Break point chlorination

The addition of chlorine to ammonia in water produces chloramines which do not have the same efficiency as free chlorine. If the chlorine dose in the water is increased, a reduction in the residual chlorine occurs, due to the destruction of chloramine by added chlorine. The end products do not represent any residual chlorine.

Super chlorination- Addition of large doses of chorine to water and removal of excess of chlorine after disinfection, this method is applicable to heavily polluted waters whose quality fluctuates greatly.

Orthotolidine Test (OT)

Orthotolidine test enable both free and combined chlorine in water to be determined with speed and accuracy. The test was developed in 1918.

In this test, 1 ml of chlorinated sample of water is taken after the required contact period, in a glass tube. To this 0.1 ml of orthotolidine solution is added. The colour formed is observed after 5 minutes. The formation of yellow colour normally indicates the presence of chlorine (either combined or free) in the water. The more yellow the colour, the greater, is the chlorine residual. The amount of residual chlorine can be ascertained by comparing the colour developed in the glass tube with the standard colours already kept in the laboratory.

Orthitolidine-Arsentite Test (OTA)

This modification of the OT teat to determine the free and combined chlorine residual separately. Sodium arsenite is added to the chlorinated sample of water. This will dechlorine the sample and orthodolidine is then added. The colour formed (X1) now is only the intensity of colour caused by interfering agents like nitrates, iron, manganese. Now another sample is taken in another test tube and orthotolidine solution is added first, and just after 5 seconds, sodium arsenite is added. The sodium arsenite will arrest the colour to be formed by the combined chlorine.

The colour observed at the end of the experiment (X2) will be due to the free residual plus due to the interfering colour causing compounds of iron, manganese etc. Then, a third test is conducted on a third sample of water. In this, only the orthotoldine solution is added to the given sample of water and the colour is noted after 5 minutes. The noted colour (X3) will evidently be due to the free and combined chlorine plus due to interfering colour causing compounds.

Different chlorine residuals can be easily determined as follows:

Free residual chlorine = (X2) - (X1)

Combine residual chlorine = (X3) - (X2)

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In the orthotolidine test as well as in the OTA test, the temperature of water is to be controlled to room temperature.

Ozonation- Ozone is a relatively unstable gas. It is a powerful oxidizing agent. It elimination undesirable odour, taste and colour, and removes all chlorine from the water. Ozone has a strong virucidal effect. Draw back- after disinfection, ozone decomposes and disappears. No residual germicidal is present, so used as per treatment before chlorination. Dosage- 0.2-1.5 mg/litre.

Ultraviolet Irradiation (UV)

UV radiation effectively destroys bacteria and viruses. As with ozone, a secondary disinfectant must be used to prevent re-growth of micro-organisms. UV radiation can be attractive as a primary disinfectant for small systems because:

- It is readily available,
- It produces no known toxic residuals,
- It requires short contact times, and
- The equipment is easy to operate and maintain.
- No residual germicidal effect colour and turbidity and suspended or colloidal constitutes for efficient disinfection.

Purification of Water on a Small Scale

1. Household purification of water - three methods is generally available for purifying water on an individual or domestic scale.

A) Boiling- Boiling is a satisfactory method of purifying water for household purposes. Water should be placed in a container and heated until boiling. The water should be allowed to boil for at least 10-20 minutes. Once cooled the water will be ready to use. It is free from spore, cysts and ova and yields sterilized water. Boiling also removes temporary hardness of water. The taste of water is altered, but this harmless.

B) Chemical Disinfection

1. **Bleaching powder or chlorinated lime ($CaOCl_2$)**-It is a white amorphous powder with a pungent smell of chlorine. When freshly made, it contains about 33 percent of "available chlorine". It is an unstable compound. On exposure to air, light and moisture, it rapidly loses its chlorine content. But when mixed with excess of lime, it retains its strength this is called "stabilized bleach". Bleaching powder should be stored in a dark, cool, dry place in closed container that is resistant to corrosion. The principle in chlorination is to ensure "free" residual chlorine of 0.5 mg/ liter at the end of one hour contact.
2. **Chlorine solution**- Chlorine solution may be prepared from bleaching powder. 4 kg bleaching powder with 25 percent chlorine is mixed with 20 liters of water; it will give 5 percent solution of chlorine. Ready-made chlorine solutions in different strengths are also in the market. Chorine solution loses chlorine on exposure to light and prolonged storage. This solution should be kept in a dark, cool and dry place in a closed container.
3. **High test hypochlorite**- Calcium compound which contain 60 to 70 per cent available chlorine. It is more stable than bleaching powder.
4. **Chorine tablets**- Under various trade names (Halazone tablets) are available in the market. It is good for disinfecting small quantities of water, 0.5gm is sufficient to disinfect 20 liters of water.
5. **Iodine**- Iodine may be used for emergency disinfection of water. Two drops of 2 per cent ethanol solution of iodine will sufficient for one litre of clear water. Contact time 20-30 minutes is needed for effective disinfection.
6. **Potassium permanganate** - Once widely used it is no longer recommended for water disinfection. Although a powerful oxidizing agent, it is not a satisfactory agent for disinfecting water. It may kill cholera vibrio, but is of little use against other disease organisms. Drawback- altering the colour, smell and taste of water.

C) Filtration- Water can be purified on a small scale by filtering through ceramic filters as, Pasteur Chamberland filter, Berkfeld filter, Katadyn filter.

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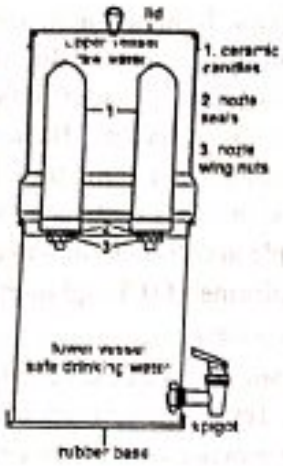


Berkfeld filter

2. Disinfection of wells- Well are the main sources of water supply in the rural areas. The need often arises to disinfect them, sometimes on a mass scale, during epidemics of cholera and gastroenteritis. The most effective and cheapest method of disinfecting wells is by bleaching powder.

Steps in well disinfection-

1. Volume of water in well-

   Depth of water in a well – (h) metre

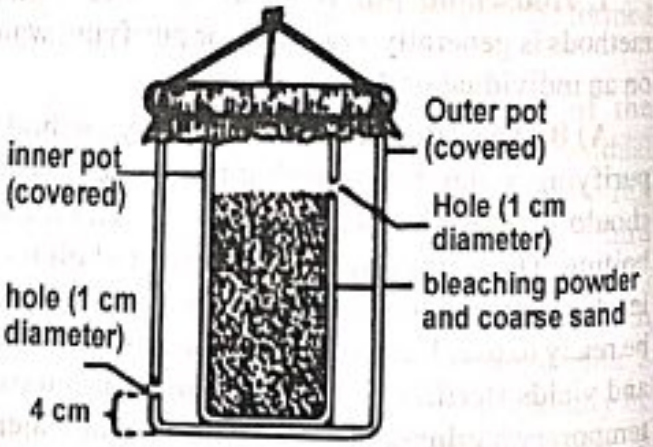
   Diameter of well – (d) in metre

   Volume in litres=$\frac{3.14 X\ d^2\ X\ h}{4}$ X 1000

2. Amount of bleaching powder required for disinfection- Estimate the chlorine demand of well water by "Horrock's Apparatus" and calculate the amount of bleaching powder required to disinfect the well. Roughly, 2.5 grams of good quality bleaching powder would be required to disinfect 1000 liters of water. Approximate dose of 0.7 mg per liter of water.
3. Dissolve bleaching powder in water- The bleaching powder required for disinfection the well is place in a bucket (not more than 100 gm in one bucket of water) and made into a thin paste. More water is added till the bucket is nearly three-fourths full. The content is stirred well, and allow to sediment for 5-10 minutes when lime settles down.
4. Delivery of chlorine solution into the well - Bucket containing the chlorine solution is lowered some distance below the water surface, and the well water is agitated by moving the bucket violently both vertically and laterally.
5. Contact period- A contact period of one hour is allowed before the water is drawn for use.
6. Orthotolidine Arsenite Test- It is practice to test for residual chlorine level is less than 0.5 mg/ liter; the chlorination procedure should be repeated before any water drawn.

Double Pot Method

During an emergency, it is desirable to ensure a constant dosage of chlorine to well water. Several simple and effective methods have been developed for the purpose. The double pot method is an improvement devised by the national environmental engineering research institute, Nagpur, India. This method uses two cylindrical pots, one placed inside the other. The inside height and diameter are 30 cm and 25 cm respectively, for the outer pot. A hole one cm in diameter is made in each pot; in the inner pot the hole is in the upper portion, near the rim and in the outer pot it is 4 cm above the bottom.



Double Pot Method

A mixture of 1 kg of bleaching powder and 2 kg coarse sand (approx 2 mm in diameter) is prepared and slightly moisture with water. The inner pot is filled with this mixture up to 3 cm below

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the level of the hole. The inner pot is introduced into the outer one, and the mouth of latter closed with polyethylene foil. The pot should be immersed at least 1 m below the water level to prevent damage by the buckets used for drawing water. It works satisfactory for 2-3 weeks in small household wells containing 4500 litres of water and draw off rate of 360-450 litres per day.

Water quality- criteria and standard

The guideline for drinking water quality recommended by WHO relate to following variables-Acceptability aspects, Microbiological aspects, Chemical aspects, Radiolo-gical aspects.

Acceptability aspects

A. Physical parameters- The ordinary consumer judges the water quality by its physical characteristics.

Turbidity- drinking water should be free from turbidity. Turbidity interferes with disinfection and microbiological determination. Water with turbidity of less than 5 nephelometric turbidity units (NTU) is usually acceptable to consumer.

Color- drinking water should be free from color which may be due to presence of colored organic matter, metals, such as iron and manganese, or highly colored industrial wastes. The guideline value is up to 15 true color units (TCU) although levels of color.

Taste, odour and palatable- free from disagreeable taste, no disagreeable odour. No health based guideline value is proposed for taste and odour.

Temperature- cool water is generally more palatable.

B. chemical or inorganic constituents-

Chlorides- All water including rain water containing chlorides. The standard prescribed for chloride is 200 mg/ liter. The maximum permissible level is 600 mg/ liter.

Hardness- water hardness in excess of 500mg/ liter is tolerated by consumers.

Ammonia- natural levels in ground and surface water are usually below 0.2 mg/ liter.

pH-an acceptable drinking water pH should be in between 6.5 to 8.5.

Chemical	Limit per liter
Hydrogen sulphide	0.05-0.1 mg/ liter
Iron	0.3 mg/ liter
Sodium	200 mg /liter
Sulphate	250 mg /liter
Dissolved solids	Less than 600 mg/liter
Zinc	5 mg/liter
Manganese	0.1 mg/liter
Copper	1 mg / liter
Aluminum	0.2 mg/ liter

Microbiological aspects- Natural and treated water vary in microbiological quality, ideally, drinking water should be contain any micro-organisms known to be pathogenic. It should also be free from bacteria indicative of pollution with excreta.

Coliform organisms- sample should not be detectable in any 100ml.

Faecal streptococci- regularly occur in faeces, but in smaller number than E. coli.

Cl. Perfringens- it is also regularly in faeces, through generally in much smaller than E. coli.

Virological aspects- It is recommended that, to be acceptable, drinking water should be free from any viruses infections for man. Disinfection with 0.5 mg/L of free chlorine residual after contact period of at least 30 minutes at a pH of 8.0 is sufficient to inactivate virus.

Biological aspects- Drinking water should not contain any pathogenic intestinal protozoa and helminths and free living organisms.

Chemical Aspects

The health risk due to toxic chemicals in drinking water differs from that caused by micro-biological contaminants. There are few chemical constituents of water that can lead to acute health problem except through massive accidental contamination of supply.

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Constituents	Recommended maximum limit of concentration
Inorganic chemical	
Arsenic	0.01 mg/litre
Cadmium	0.003 µg/litre
Chromium	0.05 mg/litre
Cyanide	0.07 mg/litre
Fluoride	1.5 gm/litre
Lead	0.01 mg/litre
Mercury	0.001 mg/litre
Nitrate and nitrite	50 mg /litre and 3 mg /litre
Selenium	0.01 mg/litre
Organic chemical	
Chlorinated alkanes	
Carbon tetrachloride	2 µg/litre
Dichloromethane	20 µg/litre
Chlorinated ethenes	
Vinyl chloride	55 µg/litre
1.1 –dichloroethene	30 µg/litre
1.2 – dichloroethene	50 µg/litre
Aromatic hydrocarbons	
Benzene	10 µg/litre
Toluene	700 µg/litre
Xylenes	500 µg/litre
Ethylbenzene	300 µg/litre
Styrene	20 µg/litre
Benzolalpyrene	0.7 µg/litre

Radiological Aspects

The effects of radiation exposure are called "somatic". The aim of radiation protection therefore exist harmful non-stochastic effects and reduce the probability of stochastic effects to a level deemed acceptable.

Gross alpha activity 0.1 Bq/L
Gross beta activity 1.0 Bq/ L

Hardness of Water

Hardness may be defined as the soap destroying power of water. The consumer considers water hard if large amounts of soap are required to produce lather. The hardness in water caused mainly by four dissolved compounds.

1. Calcium bicarbonate
2. Magnesium bicarbonate
3. Calcium sulphate
4. Magnesium sulphate

The presence of any one of these compounds produces hardness. Chlorides and nitrates of calcium and magnesium, iron, manganese, aluminum can also cause hardness but they occur generally in small amounts.

Hardness is classified as carbonate and non-carbonate.

Carbonate hardness- the carbonate hardness which formerly designed as "temporary" hardness is due to presence of calcium and magnesium bicarbonates.

Non-carbonate hardness- formerly designed as "permanent" hardness, it is due to calcium and magnesium sulphate, chlorides and nitrates.

Hardness in water is expresses in terms of "milli-equivalents per liter (mEq/L)". One mEq/L of hardness producing ion is equal to 50 mg calcium carbonate in one liter of water. Drinking water should be moderately hard. Softening of water is recommended when the hardness exceeds 3 mEq/L

Classification	Level of hardness (mEq/L)
Soft water	Less than 1 (50mEq/L)
Moderate water	1-3 (50-150mEq/L)
Hard water	3-6(150-300mEq/L)
Very hard water	Over 6 (>300mEq/L)

Disadvantages of hardness

1. Hardness in water consumes more soap and detergents.
2. Hard water is heated, the carbonate are precipitated and bring about furring or scaling of boilers. This leads more fuel consumption, loss efficiency and sometimes causes boiler explosions.
3. Hard water adversely affects cooking, food cooked soft water retains its natural color and appearance.
4. Fabrics washed with soap in hard water do not have a long life.
5. There are many industrial processes in which

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hard water is unsuited and gives rise to economic losses.

6. Hardness shortens the life of pipes and fixtures.

Special Treatment

a) Removal of hardness-

Temporary Hardness-

1. Boiling
2. Addition of lime
3. Addition of sodium carbonate
4. Permutit process

Permanent Hardness-

1. Addition of sodium carbonate
2. Base exchange process

1. **Boiling** –Boiling removes the temporary hardness by expelling carbon dioxide and precipitating the insoluble calcium carbonate. It is an expensive method to soften water on a large scale.

$$Ca(HCO_3)_2 \rightarrow CaCO_3 + H_2O + CO_2$$

2. **Addition of lime-** Lime softening not only reduces total hardness total hardness but also accomplishes magnesium reduction. Lime absorbs the carbon dioxide and precipitates the insoluble calcium carbonate. In Clark's method of softening water. One ounce of quick lime is added to every 700 gallons of water for each degree of hardness.

$$Ca(OH)_2 + Ca(HCO_3)_2 \rightarrow 2CaCO_3 + 2H_2O$$

3. **Addition of Sodium Carbonate-** Sodium carbonate removes both temporary and permanent hardness.
4. **Base Exchange process-** in the treatment of large water supplies, the permutit process is used. Permutit is a complex compound of sodium, aluminum and silica. It has the property of exchanging the sodium cation for the calcium and magnesium ions in the water. When hard water is passes through the permutit the calcium and magnesium ions are entirely removed by Base Exchange and sodium permutit is finally converted into calcium and magnesium permutit. By this process, water can be softened to zero hardness. Permutit process removes both temporary and permanent hardness.

Water hardness and cardiovascular disease- reports from several countries have shown an inverse statistical association between the hardness of drinking water and the death rate from cardiovascular diseases. Areas supplied with soft drinking water showed a significantly higher prevalence of arteriosclerotic heart disease, or degenerative heart disease, hypertension, sudden deaths of cardiovascular origin, or a combination of these.

b) Fluoridation of water- Fluorine is one of the constituents naturally present in water supplies. In fact, the main source of fluorine is drinking water. Deficiency of fluorine in drinking water is associated with dental cries, and excess with dental and skeletal fluorosis. 0.5 to 0.8 ppm in drinking water as optimum.

c) Defluoridation- water may contain a high level of fluorides. In such communities, water is defluroidated by phosphate to reduce fluorides to optimum levels.

Horrock's Apparatus

Horrock's water testing apparatus is designed to find out the dose of bleaching powder required for disinfection of water.

Contents-

1. 6 white ups (200ml capacity each)
2. One black cup with circular mark on the inside
3. 2 metal spoons (each holds 2gm of bleaching powder when filled level with the brim)
4. 7 glass stirring rods
5. One special pipette
6. Two droppers
7. Starch-iodide indicator solution
8. Instruction folder

Procedure-

1. Take one level spoonful 2 gm. of bleaching powder in the black cup and make it into a thin paste with a little water. Add more water to the paste and make up the volume up to the circular mark vigorous stirring. Allow to settle. This is the stock solution.

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2. Fill the 6 white cups with water to be tested, up to about a cm below the brim.
3. With the special pipette provided add one drop of the stock solution to the 1st cup, 2 drops to 2nd cup, 3 drops to the 3rd cup, and so on.
4. Stir the water in each cup using a separate rod.
5. Wait for half an hour for the action of chlorine.
6. Add 3 drops of starch-iodine indicator to each of the white cups and stir again. Developments of blue color indicate the presence of free residual chlorine.
7. Note the first cup which shows distinct blue color. Supposing the 3rd cup shows blue color, then 3 level spoonful's or 6 grams of bleaching powder wound be required tom disinfect 455 liters of water.

Jala Pariksha (Test for purity of water)

तयोद्वन्द्वयोरपि परीक्षणं कुर्वीतशाल्योदनपिण्डमकुथित-मविदग्धं रजतभाजनोपहितं वर्षति देवे बहिष्कुर्वीत, स यदि मुहूर्तं स्थितस्तादृश एव भवति तदा गाङ्गं पततीत्यवगन्तव्यं; वर्णान्यत्वे सिक्थप्रक्लेदे च सामुद्रमिति विद्यात, तन्नोपादेयम। सामुद्रमप्याश्वयुजे मासि गृहीतं गाङ्गबद्भवति। गाङ्गं पुनः प्रधानं, तदुपाददीताश्वयुजे मासि। शुचिशुक्लिततपटैकदेशच्युतमथवा हर्म्यतलपरिभ्रष्टमन्यैर्वा शुचिभिर्भाजनैर्गृहीतं सौवर्णे राजते मृन्मये वा पात्रे निदध्यात। तत् सर्वकालमुपयुञ्जीत, तस्यालाभे भौमम। तच्चाकाशगुणबहुलम॥ (सु.सू. 45/7)

Ganga is rain water usually falling in Asvayuja (September and October month). Both these should be put to test-rain water collected in a silver vessel and lump ofboiled rice is immersed in it, when examined after staying for a Muhurta, if l the lump is seen not very moist and not changed in colour but remain as it was before, then that water is to be understood as Ganga, if there appears a change of colour or the particles of lump are highly moist, slimy and very soft then that water should be understood as Samudra.

Samudra Jala also qualities of Ganga water during month of Asvaja.

During Varsha Rutu rain water or water from spring may be used.

During Sharad Rutu all kinds of water may be used because of being clear.

During Hemanta Rutu water of either natural lake or artificial lake may be used.

During Vasanta Rutu water of artificial tank may be used

During Grishma Rutu also same manner

During Varsha Rutu water collected in burrow and all kind which are not rain may be used.

Jala Shodhana (Purification of Water)

व्यापन्नस्य चाग्निक्वथनं सूर्यातपप्रतापनं तप्तायः पिण्डसिकतालोष्ठाणां वा निर्वापणं प्रसादनं च कर्तव्यं, नागचम्पकोत्पलपाटलापुष्पप्रभृतिभिश्चाधिवासनमिति॥

(सु.सू. 45/12)

Boiling over fire, heating by exposing to sunrays, immersing heated iron balls, sand or stone into water are the method to purify contaminated water. Putting flower such as Naga Champaka, Utapala, Patala etc. Into water and allowing these for some time to stay in it removes bad smell and imparts good smell.

सौवर्णे राजते ताम्रे कांस्ये मणिमयेऽपि वा।
पुष्पावतंसं भौमे वा सुगन्धि सलिलं पिबेत॥

(सु.सू. 45/13)

Water kept stored in vessels made of gold, silver, copper, bronze, precious stones or in earthen pots and made fragrant by putting flower into it should be used for drinking.

Jala Prasadana (Clearing turbidity of water)

तत्र सप्त कलुषस्य प्रसादनानि भवन्ति।

तद्यथा- कतकगोमेदकबिसग्रन्थिशैवालमूलवस्त्राणि मुक्तामणिश्चेति॥ (सु.सू. 45/17)

Methods of clearing the turbidity of polluted water are seven- such as the use of Kataka, Gomedaka, Bisagranthi, Saivalamula these are immersed in water; Vastra, Mukta and Mani(gems)

Jala Nikshepana (Water stands)

पञ्च निक्षेपणानि भवन्ति।

तद्यथा–फलकं, त्र्यष्टकं, मुञ्जवलय, उदकमञ्चिका, शिक्यं चेति॥ (सु.सू. 45/18)

Water stands are five, such as wooden planks, tripod stand with eight steps, rings of Munja grass, water shed and pot hangers.

Jala Sitikarana (Water cooling)

सप्त शीतीकरणानि भवन्ति; तद्यथा- प्रवातस्थापनम,

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उदकप्रक्षेपणं, यष्टिकाभ्रामणं, व्यजनं, वस्त्रोद्धरणं, वालुकाप्रक्षेपणं, शिक्यावलम्बनं चेति ॥ (सु.सू. 45/19)

Methods of keeping the water cool, are seven such as exposing to breeze, keeping pots of cold water one over the other, wrapping the pots with cloth and sprinkling water frequently, stirring with sticks, fanning, lifting through cloth dipping clean cloth in water and lifting, repeating this acts frequently; keeping the water pot hidden in a sand bed and keeping the pot in a hanger.

Quality of Water Stored in Different Vessels as per Classics

Acharya Sushruta has mentioned some easy water storage procedure in various containers to make it safe and suitable for drinking. Water stored in metallic pots like Souvarna (gold), Rajat (silver), Tamra (copper), Kanshya (bronze), Mani (precious stone), Mrittika Patra (earthen pot) and fragrant water by using scented flowers into it should be used for drinking purpose. Tamra Jalapatra (copper pot) is Uttama (best) and in absence of copper one should use mud pot which is Hitakari. In other texts we find various types of storage vessels of water and its quality. These storage vessels have been suggested by Acharyas after long years of observation.

Qualities of Storage Container of Water- Reference -Bhojanakutalahalam

Different types of vessels	Qualities of water
Hema/Souvarna (gold) Bhajana	Suswadu (sweet) Vipaka, Sheetala (cold in potency), Laghu (light), Tridoshasamana (balances all three Doshas), Virya-Bala-Medhakara (improves fertility, immunity, intelligence), Subha (auspicious)
Trapusa (tin) Bhajana	Picchila (sticky), Madhura rasa (sweet taste), Kaphakara (increases Kaphadosha), Sheeta (coolant), Agni vardhana (improves digestion), Malakara(increases the bulk of faeces and urine), Vata vardhana (increases Vata dosha)
Tamra (copper) Bhajana	Ushna Virya (hot in potency) Swadu (sweet), Katu Rasa (pungent in taste), KatuVipaka (pungent in potency), Pittaanilaprada (vitiates Pitta & stimulates digestive fire), Sakritmarutanasana (decreases quantity of faeces and flatus)
Ghosa (bell-metal) Bhajana	Ushna Vipaka (hot in potency), Katu (pungent), Guru (heavy to digest), Pittasleshmaprada (aggravates Pitta & Sleshma dosha), Marutanasanam (destroy Vata dosha)
Pittala/ Rittika (brass) Bhajana	Katu rasa (pungent in taste), Sleshma Piita Vinasha (reduces Kapha & Pitta Dosha), Ushna (hot in potency), Meharoga Vivardha-nam (causes progression of Prameha)
Louha (iron) Bhajana	Atyanta Ruksha (very dry), Raktapittahara (treats bleeding disorders), Kanduhara (reduces itching), Tridoshasamana (vitiations of all three Doshas)

Qualities of Heated Water in Different Vessel

(Reference- Ayurveda Mahodadhi, Sushena-Bhaja Adhiavasa Vidhi Adhyaya 1-13)

Water heated in particular vessels	Properties
Louhabhajana Santaptam (heated in iron vessel)	Mandagnikara (diminished Agni), Malanam Rechana (purges the Malas), Amashaya Kshalana (cleanses stomach)
Madhudumbarabhajana taptitam (heated over the vessel prepared from the wood of Udumbara)	Uttam (ideal for body), Bapukantiprada (increases lustre of body), Pittakara (alleviates Pitta)
Mrittkabhajana Taptam (heated over an earthen vessel)	Malakshalana (cleanse out waste products), Hitam (wholesome), Dhatu Satmya (wholesome for tissues of the body), Virya- Bala-Oja-Parivardhanam (promotes vitality, strength & vitality)

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Rain Water Harvesting and Water Recycling

Water forms the lifeline of any society. Water is essential for the environment, food security and sustainable development. All the known civilizations have flourished with water source as the base and it is true in the present context too. Availability of drinking water and provision of sanitation facilities are the basic minimum requirements for healthy living. Water supply and sanitation, being the two most important urban services, have wide ranging impact on human health, quality of life, environment and productivity. Despite the technological advancements, the global scenario still remains grim, as all the inhabitants of the world do not have access to safe water and adequate sanitation.

Declining trend of rainfall and rapid urbanization with industrialization has created increasing demand for water. Growing water shortage is already causing problems in several areas and available resources like rivers, ponds, lakes are shrinking, causing more and more pressure on the sub soil water resources. The rate of water extraction is exceeding the replenishment that takes place by natural processes- mainly recharge due to rainfall.

Rainwater harvesting is a technique used for collecting, storing, and using rainwater for landscape irrigation and other uses. The rainwater is collected from various hard surfaces such as roof tops and other types of manmade above ground hard surfaces. This ancient practice is currently growing in popularity throughout our communities due to interest in reducing the consumption of potable water and the inherent qualities of rainwater. This web site will mainly focus on general information about rainwater harvesting systems, rain water system advantages and disadvantages, and helpful links and references.

Conservation of water resources requires-

1. Prevention of wastage- Wide-spread awareness needs to be developed among people about economical use of water. It has to be propagated that people about make effort not waste water, and help in reducing consumption of the invaluable water reserves. Efficient water management can substantially reduce total water required of communities, domestic consumption of water can be reduced by individuals, by cultivating better habits in kitchen and bathroom use, to avoid free running of water.

2. Water harvesting- Simple innovative ideas like water harvesting are extremely important to preserve and buildup underground water reserves in urban and semi urban areas, where considerable water is drawn out by tube well for domestic consumption.

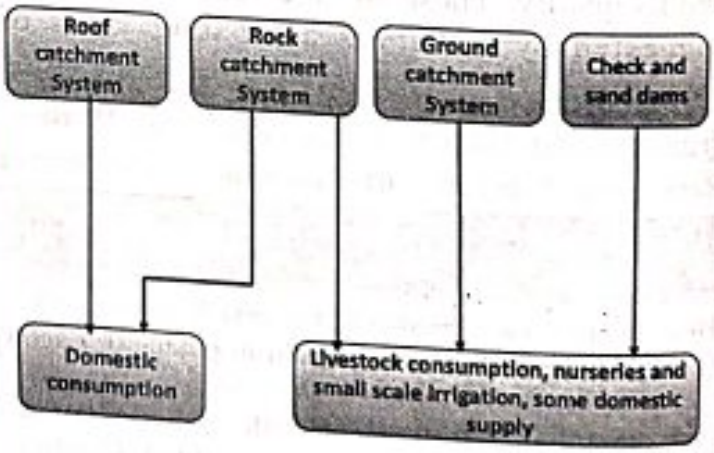
Rainwater harvesting means capturing the rain where it falls or capturing the runoff and taking measures to store that water and keep it clean. Rainwater harvesting can be undertaken through a variety of ways:

Capturing run-off from roof tops

Capturing run-off from local catchments

Capturing seasonal flood water from local streams

Conserving water through watershed management


Roof catchment System
Rock catchment System
Ground catchment System
Check and sand dams
Domestic consumption
Livestock consumption, nurseries and small scale irrigation, some domestic supply

Rainwater Harvesting

Rainwater Harvesting Advantages

1. Makes use of a natural resource and reduces flooding, storm water runoff, erosion, and contamination of surface water with pesticides, sediment, metals, and fertilizers.
2. Reduces the need for imported water (the San Diego region imports between 80%-90% of

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its water from Northern California and Colorado River).

3. Excellent source of water for landscape irrigation, with no chemicals such as fluoride and chlorine, and no dissolved salts and minerals from the soil.
4. Home systems can be relatively simple to install and operate may reduce your water bill.
5. Promotes both water and energy conservation.
6. No filtration system required for landscape irrigation.

Rainwater Harvesting Disadvantages

1. Limited and uncertain local rainfall.
2. Can be costly to install.
3. The payback period varies depending on the size of storage and complexity of the system.
4. Can take considerable amount of time to "pay for itself".
5. Requires some technical skills to install and provide regular maintenance.
6. If not installed correctly, may attract mosquitoes. (i.e. West Nile Disease and other waterborne illnesses)
7. Certain roof types may seep chemicals, pesticides, and other pollutants into the water that can harm the plants.
8. Rainwater collected during the first rain season is generally not needed by plants until the dry season. Once catchment is full, cannot take advantage of future rains.

Soil

Syllabus- Soil: Types of soil and relation between soil and health. Land pollution - its prevention and control. Land purification as per the classics. Social goals of Housing and Housing standards. The Building and other construction workers (Regulation of employment and conditions of services) Act, 1996 Effects of housing on health. Overcrowding and its impact on health.

Learning objectives- 1. Enlist the types of soil. 2. Interpret the relation between soil and health. 3. Explain Land pollution and its prevention and control. 4. Explain land purification as per the classics. 5. Explain the Social goals of Housing and Housing standards. Understanding of the building and other construction workers Act,1996 6. Analyze the effects of housing on health. 7. Explain overcrowding and its impact on health

Soil is one of the important and valuable resources of the nature. Life and living on the earth would be impossible without healthy soil. 95% of human food is derived from the earth. Making plan for having healthy and productive soil is essential to human survival. Entrance of materials, biological organisms or energy into the soil will cause changes in soil quality. This problem causes soil to remove from its natural state.

The dead part of the soil includes weathered rocks and minerals which are obtained from the decay of plants and animals, which is called organic matter or humus, and water and air are categorized in this part. But the live soil is the soil which enjoys small animals like insects and worms and plants, fungi, bacteria and other microbes are grown in the live soil.The soil is composed of 50% of organic and inorganic matters, and 50% of air and water which fills existing vacant spaces of the soil and keeps live organisms of the soil.

Formation of soil from the parent material (bedrock): mechanical weathering of rocks by temperature changes, abrasion, wind, moving water, glaciers, chemical weathering activities and lichens. Under ideal climatic conditions, soft parent material may develop into 1 cm of soil within 15 years.

Land = earth = soil

Soil is critical to life Plants get nutrients from soil and Animals get nutrients from plants.

Four major components-

1. Mineral particles (rocks and clays)
2. Organic matter
3. Water
4. Air

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Soils vary in different aspects

a. Color
b. Thickness
c. Layers
d. Amount of clay, salt, & organic matter

Samanya Bhumi Pariksha (General Examination of land)

श्वभ्रशर्कराश्मविषमवल्मीकश्मशानाघातनदेवतायतनसिकताभिरनुपहतामनूषरामभङ्गुरामदूरोदकां स्निग्धां प्ररोहवतीं मृद्वीं स्थिरां समां कृष्णां गौरीं लोहितां वा भूमिमौषधग्रहणाय परीक्षेत । तस्यां जातमपि कृमिविषशस्त्रातपपवनदहनतोयसम्बाधमार्गैरनुपहतमेकरसं पुष्टं पृथ्ववगाढमूलमुदीच्यां चौषधमाददीतेत्येष भूमिपरीक्षाविशेषः सामान्यः ॥ (सु.सू. 36/3)

Land for the temple and house for Brahmins should be square elevated and in south -west direction. Smell of horse, elephant, bamboo, water store, Nagakeshar, Mallika, Dhanya and Patala in the land is good.

Land with good smell, plane land which is fertile so that seeds germinate fast, dark coloured, Snigdha and soft to touch is good for construction. Tree of Bilwa, Nimba, Nirgundi, Saptaparnaka , Amra, Bibhitaki should be grown nearby land should be plane, without big pieces of mud pot, stone, manure pits, small wood pieces and big gravels, ash and yellow colour.

Land with smell of curd, ghee, honey, oil, blood, cow and lotus and white, red, yellow and black colour, sound of elephants and horse and having six Rasa, single coloured, devoid of stones, saw dost etc. spines, bones, cervices, elevated in south eastern direction are ideal land for construction.

Panchavidha Bhumi (five kinds of lands)-

विशेषतस्तु तत्र, अश्मवती स्थिरा गुर्वी श्यामा कृष्णा वा स्थूलवृक्षशस्यप्राया स्वगुणभूयिष्ठा; स्निग्धा शीतलाऽप्सन्नोदका स्निग्धशस्यतृणकोमलवृक्षप्राया शुक्लाऽम्बुगुणभियिष्ठा; नानावर्णा लध्वश्मवति प्रविरलाल्पपाण्डु वृक्षप्ररोहाऽग्निगुणभूयिष्ठा; रुक्षा भस्मरासभवर्णा तनुवृक्षाप्तरसकोटरवृक्षप्राया ऽनिलगुणभूयिष्ठाः मृद्वि समा श्वभ्रवत्यव्यक्तरसजला सर्वतोऽसारवृक्षा महापर्वतवृक्षप्राया श्यामाचाकाशगुणभूयिष्ठा ॥ (सु.सू. 36/4)

The land which is rocky, stable, heavy, blue black or black, with more of big trees and plants of the same features of **Parthiva Bhumi.**

Snigdha, cold, with water nearby all around with more of unctuous plants, grass, tender trees- all of white colour, is the land with qualities of water **Apya Bhumi.**

More of small rocks, of many colours, small white trees, plants and sprouts; growing sparsely is land predominant in qualities of Agni is **Agni Bhumi.**

Which is dry, with soil of colour of ash or donkey, predominant in thin trees with less of sap and more of hallow pockets is the land with qualities of wind predominately is **Vayaviya Bhumi.**

Which has soft soil, pits in the ground, juice of plants and water being not tasty, sapless trees, growing all around, with more of huge mountains and trees and blue-black soil is the land with qualities of the sky is **Nabhasa Bhumi.**

Land unfit for construction

Land having smell of dead body, fish and birds is not good. Land near holy tree, king's palace, public halls, temple and spiny plants are unfit for construction. Land which is round, triangular, irregular, very hard, situated near Candana tree, leather processing is not good for construction.

The use of Vastu Sashtra is specific to an individual and involves complex mathematical calculations along with the knowledge of astrology, geometry and philosophy and the purpose for which the construction of the building is required.

Nivasa Yogya Bhumi

सुगन्धा ब्राह्मणी भूमी रक्तगन्धा तू क्षत्रिया ।
मधुगन्धा भवेद्वैश्या मद्यगन्धा च शूद्रिका ॥
(कल्पद्रुम)

Sugandha Yukta Bhumi for Brahmina, Raktagandha Yukta Bhumi for Kshatriya, Dhanyagandha Yukta Bhumi for Vaishya and Madyagandha Yukta Bhumi for Shudra.

मनसश्चक्षुषो यत्र सन्तोषो जायते भुवि ।
तथां गृहं [illegible] ॥
(गृहभूषण)

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Land which is pleasing for eyes and mind is ideal for construction of house.

Grahyabhumi- (land fit for construction)

शस्तौषधिद्रुमलता मधुरा सुगंधा स्निग्धा समा न सुषिरा च माही नराणाम् अ ।

अप्यध्वनिश्रमविनोदमुपागतानां धते श्रियं किमुत शाश्वतमन्दिरेषु ॥ (बृहत्संहिता)

श्वेत्वासृक पीत कृष्णा ह्यगजनिनदा षड्रसा चैकवर्णा, गोधान्याम्भोजगन्धोपलतुषरहिताप्रतीच्युन्नता या ।

पूर्वो दग्वारिसारा वरसुरभिमसा शूलहिनास्थिवर्ज्या, सा भूमिः सर्वयोग्या कणदररहिता सम्मताद्यैर्मुनीन्दैः । (मयमतम)

Land with white, red, yellow, black, sound horse, elephant and having six Rasa, single coloured, devoid of stones, saw during spines, bones, cervices and elevated in south eastern direction is the ideal land for construction of houses.

Agrahyabhumi (land unfit for construction)

शवमीनपक्षिगन्धा या सा धरा निन्दिता वरैः ।
सभा चैत्य समीपस्था नृपमन्दिर संश्रिता ।
देवालय समीपस्था कण्टकीद्रुमसंयुता ।
वृत्त त्रिकोण विषमा वज्राभा कच्छपोन्नता ।
चण्डालवासगच्छाया चर्मकारालायश्रिता ॥
(मयमतम)

Land having smell of dead body, fish, and bird is not good. Land near Caitya Vruksha, king's palace, public halls, temple and spiny plants is unfit for construction. Land which is round, triangular, irregular, very hard like diamond, elevated like tortoise, situated near house of Canadal, shadowed and leather processing unit nearby is unfit for construction.

Building should have following arrangements-

Udapana (water reservoir), Udukhala (Mortac), Musala (Pestle), Varcahsthana (latrine), Snana Bhumi (bathroom), Mahanasa (kitchen).

According to Mayamatama, Brihat samhita of Varaha Mihira, Vastu Shastra.

Types of Earth: Earth is classified according to its colour brick red, dark brown; white, red, yellow, mixed colour, black and also according to their smell, taste. Texture, etc., Black and clayey soil is not good for construction and while designing the foundation/ footings, the load bearing capacity of the soil should be ascertained. Sites with big boulders, anthills or where murder or burial has taken place and those with loose or filled -up earth should be avoided.

Directional Alignment- The directional axis of the plot should be properly aligned with the axis of the earth's magnetic field.

Boundaries AC & BD should be parallel to a north-south axis. While boundaries AB & CD should be in an East-West alignment.

For otherwise, such land will remain averse to overall growth, peace & happiness of those that shall inhabit it.

The geometrical axis of the plot should be properly aligned with the axis of the earth's magnetic field. i.e. one set of boundaries should be parallel to the north south axis and the other to the east -west axis as shown in the figure (a) and (b).

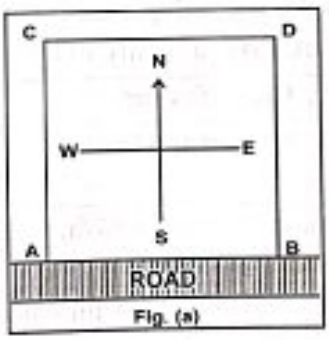

Figure (a) shows directional alignment

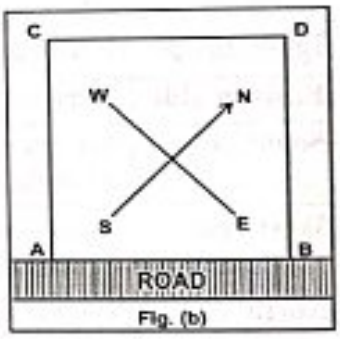

Figure b) shows a non directionally aligned plot

Shape of the Site

Symmetrical shapes like square or rectangular, circular & hexagonal promote overall growth, increases mental capabilities and generates prosperity.

Asymmetrical shapes like oval, triangular, parallelogram, star & trident are deemed inauspicious.

Slope of the Land Surface

The surface should be elevated towards the

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southern and western sides and should be lower in northern and eastern sides for overall growth and prosperity.

The Land should be elevated towards south and west sides and it should be lower in **NORTH** and **EAST** sides for overall growth and happiness.

If the land is-

High in north or east
Low in south-east
Low in south-west
Low in north-west
Impact of Gates at Various Locations

Eastern Side: The third and fourth gate promote prosperity.

Southern Side: The twelfth gate enhances growth.

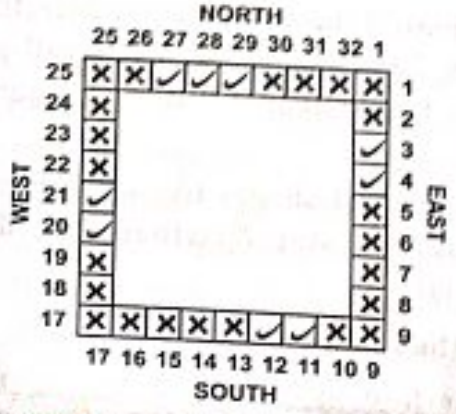
Western Side: The twentieth and twenty-first gates stimulate financial growth.

Northern Side: The twenty-seventh, twenty-eighth and twenty-ninth gates promote happiness, financial growth and overall gain respectively.

Of all the positions of the gates depicted in the figure, the positions that are favorable are in the

Eastern side	Prosperity, Govt. favour.
South side	Meanness, Prosperity, human growth
West side	Financial and human growth, Financial and human growth
North side	Happiness, Financial and human growth, All types of gains

All the other placements of the gates (markedCross) prove to be unfavorable.



Brahmasthana (Central Zone of the Building)-Should be free from any obstruction in the form of a wall, pillar and beam. There should not be any fixture, toilet, lift or staircase etc. in this area as shown in the Figures (a) and (b)

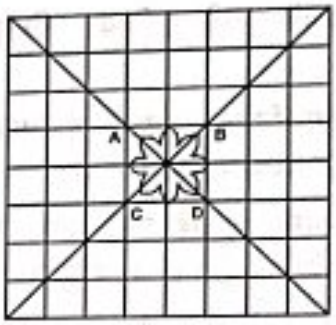


Fig. (a)

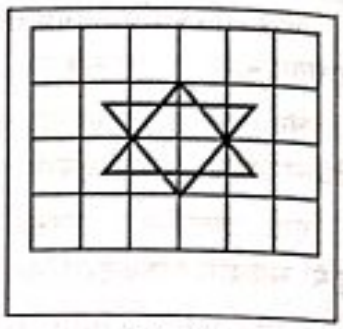


Fig. (b)

For Figure (a) Jurisdiction of Brahmsthana in a square building as shown by the central square ABCD. For Figure (b) Jurisdiction of Brahmsthana in a rectangular building is shown by a central "STAR"

The Staircase

Should be in the western or northern side of the building.

Turnings should be in the clockwise direction.

On reaching the upper floor, the facing should be towards south or east.

Inner Planning of a House

The oven should ideally be in the south-east zone.

NW	N			NE
Store	Conjugated Living	Treasure	Medical Room	Pooja
Place for Mourning				Multi-Purpose Room
Dinning		Centre (Free From obstruction)		Bathroom
Study				Curd Curning
Armoury or Maternity Room	Toilet	Sleeping	Ghee Store	Cooking Fire
SW	S			SE

W E

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Toilets should not be in the north-eastern, central and south-western zones.

The most south-western location is the ideal position for your master bedroom.

Position the boy's room in the northern or eastern side while the girl's and guest room are to be in the north-western parts.

Place the beds in southerly or easterly direction.

The provisions shown in the side diagram are as per the living style in the ancient times. However considering the requirements of the modern days it can be rearranged based on the following guide lines.

1. Kitchen fire should be in the South -East and should never be at the North-East, Centre and the south west zones.
2. Toilets should not be provided at the North-East, Center and the South-West zones.
3. Master bedroom should be in or nearest to the South-west Zones.
4. Boys' Rooms should be in the North and/or East Zones.
5. Girls and Guest rooms should be in the North - West zones.
6. Head Seat of the Bed should be in the South or the East Direction.
7. Facing of the W/C should be towards the north or West Direction

Inner Planning of an Office

- The shape of the cabin should be a regular square or a perfect rectangle.

NW	N	NE
Field Staff Visitors Store Room Pantry/Utilities	Reception Visitors Junior Staff	No Pantry/No Toilet Junior Staff Reception Visitors Pooja Cashier
W Directors OR Managers OR Senior Staff	Lounge Free From Fixtures & Obstacles	Junior Staff Computer Room Pantry/Utilities **E**
Master Chamber No Pantry/No Toilet	Directors OR Managers OR Senior Staff	Reception Visitors A/c's Deptt. Computer Room Engg. Section Pantry/Utilities
SW	S	SE

- The opening for the door should be free from any obstacle.
- Doors should open inwards while entering a cabin.
- The master chamber should either be in the south-west or nearest to south- west direction.
- Chambers of directors / managers / senior staff should be in the southern & western zones.
- While that of the junior staff should be in the north-west, north, north-east, east and south-east.
- Pantry and toilets must be in north-eastern, central & south-western sections.

While making the interior of an office the following guidelines have to kept in mind

1. The shape of the cabin should be regular i.e. Square, or Perfect rectangle etc.
2. There should not be any obstacle in front of the door opening.
3. The door leaves should pushed inside while entering into the cabin.
4. The master chamber should be in the south west or nearest to the south west zone.
5. The directors/managers/senior staff should be in the south & west zones.
6. The junior staff and other activities should be in the North-West, North, North-East, East and South East Zones.
7. The facing of the Directors/Managers/Officers should be towards East or North.
8. Pantry and Toilets should not be in North-East, Center & South-west Zones

Internal Planning of any Industrial Building

- Heavy plant and machinery should be installed in the south-western, southern & western parts.
- Light weight and auxillary machines should be in the northern & eastern zones.
- Install boiler, AC panels, generator, heater, dryer, oven, furnace etc. in the north-west & East sections.
- Toilets should be placed in the north-east, centre or south-west.
- Make sure not to place spare parts stores in the north-west, centre & south-east.

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Rest rooms for labour should be in the northern & eastern zones.

1. Heavy plant machinery should be installed in the South-West, South and West Zones.
2. Light Weight and Auxiliary machines should be installed in North and East Zones.
3. Boiler/AC Panels/ Generator/Heater/Dyer/ Oven/Furnace etc are best in the South East but can also be installed in the North-West and East Zones.
4. Toilets or Fire/Power installations should not be provided in the North-East, Center and South-West zones.

Land Pollution

Land pollution is the degradation of earth's land surfaces often caused by human activities and its misuse. Haphazard disposal of urban and industrial wastes, exploitation of minerals, and improper use of soil by inadequate agricultural practices are a few of the contributing factors. Also, increasing urbanization, industrialization, and other demands on the environment and its resources is of great consequence to many countries.

Causes of Land Pollution

1. **Deforestation and soil erosion:** Deforestation carried out to create dry lands is one of the major concerns. Land that is once converted into a dry or barren land can never be made fertile again, whatever the magnitude of measures to redeem it is. Land conversion, meaning the alteration or modification of the original properties of the land to make it use-worthy for a specific purpose is another major cause. This hampers the land immensely. Also there is a constant waste of land. Unused available land over the years turns barren; this land then cannot be used. So in search of more land, potent land is hunted and its indigenous state is compromised with.
2. **Agricultural activities:** With growing human population, demand for food has increased considerably. Farmers often use highly toxic fertilizers and pesticides to get rid of insects, fungi and bacteria from their crops. However with the overuse of these chemicals, they result in contamination and poisoning of soil.
3. **Mining activities:** During extraction and mining activities, several land spaces are created beneath the surface. We constant hear about land caving in; this is nothing but nature's way of filling the spaces left out after mining or extraction activity.
4. **Overcrowded landfills :** Each household produces tonnes of garbage each year. Garbage like aluminium, plastic, paper, cloth, wood is collected and sent to the local recycling unit. Items that cannot be recycled become a part of the landfills that hampers the beauty of the city and cause land pollution.
5. **Industrialization :** Due to increase in demand for food, shelter and house, more goods are produced. This resulted in creation of more waste that needs to be disposed of. To meet the demand of the growing population, more industries were developed which led to deforestation. Research and development paved the way for modern fertilizers and chemicals that were highly toxic and led to soil contamination.
6. **Construction activities :** Due to urbanization, large amount of construction activities are taking place which has resulted in large waste articles like wood, metal, bricks, plastic that can be seen by naked eyes outside any building or office which is under construction.
7. **Nuclear waste:** Nuclear plants can produce huge amount of energy through nuclear fission and fusion. The left over radioactive material contains harmful and toxic chemicals that can affect human health. They are dumped beneath the earth to avoid any casualty.
8. **Sewage treatment :** Large amount of solid waste is leftover once the sewage has been treated. The leftover material is sent to landfill site which end up in polluting the environment.

Effects of Land Pollution

1. **Soil pollution:** Soil pollution is another form of land pollution, where the upperlayer of the

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soil is damaged. This is caused by the overuse of chemical fertilizers, soil erosion caused by running water and other pest control measures; this leads to loss of fertile land for agriculture, forest cover, fodder patches for grazing etc.

2. **Change in climate patterns:** The effects of land pollution are very hazardous and can lead to the loss of ecosystems. When land is polluted, it directly or indirectly affects the climate patterns.
3. **Environmental Impact:** When deforestation is committed, the tree cover is compromised on. This leads to a steep imbalance in the rain cycle. A disturbed rain cycle affects a lot of factors. To begin with, the green cover is reduced. Trees and plants help balance the atmosphere, without them we are subjected to various concerns like Global warming, the greenhouse effect, irregular rainfall and flash floods among other imbalances.
4. **Effect on human health:** The land when contaminated with toxic chemicals and pesticides lead to problem of skin cancer and human respiratory system. The toxic chemicals can reach our body through foods and vegetables that we eat as they are grown in polluted soil.
5. **Cause Air pollution:** Landfills across the city keep on growing due to increase in waste and are later burned which leads to air pollution. They become home for rodents, mice etc. which in turn transmit diseases.
6. **Distraction for Tourist:** The city loses its attraction as tourist destination as landfills do not look good when you move around the city. It leads to loss of revenue for the state government.
7. **Effect on wildlife:** The animal kingdom has suffered mostly in the past decades. They face a serious threat with regards to loss of habitat and natural environment. The constant human activity on land is leaving it polluted; forcing these species to move further away and adapt to new regions or die trying to adjust. Several species are pushed to the verge of extinction, due to no homeland.

The discharge of chemicals on land makes it dangerous for the ecosystem too. These chemicals are consumed by the animals and plants and thereby make their way in the ecosystem. This process is called bio magnification and is a serious threat to the ecology.

Control of Land Pollution

1. Make people aware about the concept of Reduce, Recycle and Reuse.
2. Reduce the use of pesticides and fertilizers in agricultural activities.
3. Avoid buying packages items as they will lead to garbage and end up in landfill site.
4. Proper disposal of garbage.
5. Buy biodegradable products.
6. Do Organic gardening and eat organic food that will be grown without the use of pesticides.
7. Create dumping ground away from residential areas.

Land Purification as per the Classics

Bhumi Shodhana

भुशुद्धिर्मार्जनाद्दाहात्कालातगोक्रमणाततथा ।
सेकादुल्लेखनाल्लेपातगृहमार्जनलेपनात ॥

(याज्ञवल्कल)

Cleaning, burning by standing, grazing of cows, sprinkles of water, scraping and covering lands be purified, house can be purified by wiping, washing and paint white colour.

Housing

Housing in the modern concept included not only the 'physical structure' providing shelter, but also the immediate surroundings, and the related community services and facilities. It has become part of the concept of "human settlement", which is defined as "all places in which a group of people reside and pursue their life goals; the size of the settlement may vary from a single family to millions of people".

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A WHO expert group on public health aspects of housing prefers to use the term" residential environment" which is defined as the physical structure that man uses and the environs of the structure including all necessary services, facilities, equipment and devices needed or desired for the physical and mental health and social well-being of the family and the individual.

Social Goals of Housing and Housing Standards

The generally accepted goals of housing are-

1. **Shelter-** house should provide a sanitary shelter which is a basic need.
2. **Family life-** house should provide adequate space for family life and related activities viz. preparation and storage of food, meeting, sleeping, individual activities and other activities.
3. **Accesses to community facilities-** a third element of housing is accessibility to community services and facilities such as health service, schools, shopping areas, places of worship etc.
4. **Family participation in community life-** family is a part of the wider community. Community is important to family in many ways-it can offer help in times of need; it is an important source of friends. Communities are able to pool their efforts and improve their living conditions.
5. **Economic stability -** housing is a form of investment of personal savings. It provides for economic stability and wellbeing of the family.

The implementation of social goals in housing requires that government should

a) Introduce social housing schemes
b) Establish both minimum and maximum standards
c) Create financial and fiscal institutions geared to helping low income people obtain credit for building or improving their houses.

Criteria for healthful housing

1. Healthful housing provides physical protection and shelter.
2. Provides adequately for cooking, eating, washing, and excretory functions.
3. Housing is designed, constructed, maintained and used in a manner such as to prevent the spread of communicable disease.
4. Provides for protection from hazard of exposure to noise and pollution
5. Housing is free unsafe physical arrangements due to construction or maintenance, and from toxic or harmful materials and
6. Encourage personal and community development, promotes social relationships, reflects a regard for ecological principles, and by these means promotes mental health.

Housing Standards

Minimum standard are still maintained by building regulations, the aim being improvement of housing and environmental condition for the majority of families within the limits set by available resources and objectives. Recommended by EHC housing standard-

Site Selection

a) The site should be elevated from its surroundings so that it is not subject flooding during rains.
b) The site should have an independent access to a street of adequate width.
c) It should be away from the breeding places of mosquitoes and files.
d) It should be away from nuisances such as dust, smoke, smell, excessive noise and traffic.
e) It should be in pleasing surroundings.
f) The soil should be dry and safe for founding the structure and should be well drained. "Made soil", i.e. ground that is leveled by dumping refuse is very unsatisfactory for building purpose for at least 20-25 years. The subsoil water should be below 10 feet.

Foundation - This must always be solid and

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substantial. The foundation is laid with a bed of cement concrete over the stones to cover the trench. The object is to prevent subsidence of the building. The width of the foundation should never be less than 25 inches.

Set back - for proper lighting and ventilation, there should be an open space all-round the house- this is called "setback". In rural areas it is recommended that the built-up areas should not exceed one third of the total area; in urban areas where land is costly, the built-up areas may be up to two thirds. The setback should be such that three is no obstruction to lighting and ventilation.

Floor - The floor should be Pucca and satisfy the following criteria,

a) It should be impermeable so that it can be easily washed and kept clean and dry. Mud floors tend to break up and cause dust; they are not recommended.

b) The floor must be smooth and free from cracks and crevices to prevent the breeding of insects and harborage of dust.

c) The floor should be damp-proof.

d) The height of the plinth should be 2 to 3 feet.

Walls-

a) Reasonably strong.

b) Should have a low heat capacity i.e. should be absorb heat and conduct the same.

c) Weather resistant.

d) Unsuitable for harborage of rats and vermin.

e) Not easily damaged.

f) Smooth.

These standard cab be attained by 9 inch brick wall plasters smooth and coloured cream or white.

Roof- The height of roof should be less than 10 feet in the absence of air- conditioning for comfort. The roof should have a low heat transmittance coefficient.

Rooms- The number of living rooms should be less than two, at least one of which can be closed for security. The other may be open on side if that side is a private courtyard. The number and area of rooms should be increased according to size of family, so that the recommended floor space per person may be made available.

Floor area- The floor area of living room should be at least 120 sq.ft. for occupancy by more than one person and least 100 sq. ft. for occupancy by a single person. The floor area available in living rooms per person should not less than 50 sq.ft. The optimum is 100sq. ft.

Cubic Space- Unless means are provided for mechanical replacement of air the height of rooms should be such as to give an air space of at least 500 cubic feet per capita, preferably 1000 cubic feet's.

Windows

a) Unless mechanical ventilation and artificial lighting are provided, every living room should be provided with at least 2 windows and at least one of them should open directly on to an open space.

b) The windows should be placed at a height of not more than 3 feet above the ground in living rooms.

c) Window area should be 1/5th of the floor area. Doors and windows combined should have 2.5th the floor area.

Lighting -The day light factor should exceed 1 per cent over half the floor area.

Mahanasa (Kitchen) Standards

Every dwelling house must have a separate kitchen. The kitchen must be protected against duet and smoke; adequately lighted; provide with arrangement for storing food, fuel and provisions; provided with water supply; provided with a sink for washing utensils and fitted with arrangement for proper drainage. The floor of the kitchen must be impervious.

Privy - A sanitary privy is a must in every house, belonging exclusively to it and readily accessible. In the more developed areas of the world, the majority of dwelling units are equipped with water carriage systems.

Garbage and Refuse - These should be removed from the dwelling at least daily and disposed of in a sanitary manner.

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Bathing and Washing - The house should be have facilities for bathing and washing belonging exclusively to it and providing proper privacy.

Water Supply - The house should be having a safe and adequate water supply available at all times.

Rural Housing

In rural areas, the "approved" standards may be lower than in towns. Minimum standards :

1. There should be at least two living rooms.
2. Ample verandah space may be provided.
3. The built-up area should not exceed one-third of the total area.
4. There should be a separate kitchen with a paved sink or platform for washing utensils.
5. The house should be provided with a sanitary latrine.
6. The windows area should be at least 10 per cent of floor area.
7. There should be a sanitary well or a tube well within a quarter of mile from the house.
8. It is insanitary to keep cattle and livestock in dwelling houses. A cattle shed should be open on all sides; an area 8 ft. X 4 ft. is sufficient for each head of cattle.
9. There should be adequate arrangement for the disposal of waste water, refuse and garbage.

Housing and Health

Housing is part of the total environment of man and being a part, it is to some extent responsible for the status of man's health and wellbeing. It is difficult, however, to demonstrate the specific cause and effect relationships because housing embraces so many facets of environment. Poor housing causes :

1. Respiratory infections- common cold, tuberculosis, influenza, diphtheria, bronchitis, measles, whooping cough etc.
2. Skin infection- scabies, ringworm, impetigo and Leprosy.
3. Rat infestation- plague
4. Arthropods- houseflies, mosquitoes, fleas and bugs.
5. Accidents- a substantial proportion of house accidents are caused by some defect in the home and its environment.
6. Morbidity and mortality- high morbidity and mortality rates are observed where housing conditions are sub-standard.
7. Psychosocial effects- these effects must not be overlooked. The sense of isolation felt by persons living in the upper floor of high buildings is now well known to have harmful effects. Often, also, people living in densely populated urban areas feel a similar sense of isolation which may lead to neurosis and behavior disorder.

Overcrowding

Overcrowding refers to the situation in which more people are living within a single dwelling than there is space for, so that movement is restricted. Privacy secluded, hygiene impossible, rest and sleep difficult. In general the risks as regards physical health are clear enough- infectious diseases spread rapidly under conditions of overcrowding. The effects on psychosocial health are not so clear-out, viz irritability, frustration, lack of sleep, anxiety, violence and mental a psychosocial stress, leading to unhappiness and very probably to psychosomatic and mental disorders.

Overcrowding is a health problem in human dwellings. It may promote the spread of respiratory infections such as tuberculosis, influenza and diphtheria. High morbidity and mortality rates are observed where housing conditions are substandard. The accepted standards with respect to overcrowding are as below;

1. Persons Per Room
   1 room - 2 persons 2 rooms - 3 persons
   3 rooms - 5 persons 4 rooms - 7 persons
   5 or more rooms - 10 persons (additional 2 for each further room)
2. Floor Space
   110 sq. ft. - 2 persons
   90-100 sq. ft. - 1 $^{1}/_{2}$ persons
   70-90- sq. ft. - 1 person
   50-7- sq. ft. - $^{1}/_{2}$ person

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Under 50 sq. ft.-Nil (A baby under 12 month is not counted; children between 1 to 10 years counted as half a unit).

Sex Separation- Overcrowding is considered to exist if 2 persons over 9 years of age, not husband and wife, of opposite sexes are obliged to sleep in the same room.

The Building and other Construction Workers (Regulation of Employment and Conditions of Services) ACT, 1996

The main objective of the BOCW Act is to regulate the conditions of service and the employment of BOCW Workers and to provide for their safety, health and welfare measures and for other matters associated therewith.

- The act extends to the whole of India
- It came into force on 1st March 1996

"BOCW Act" is a social welfare statute enacted by the Indian government to provide a safe and healthy working environment for the workers engaged in construction activities.

Important points

1) The Act applies to every establishment which employs or had employed ten or more building workers in any building or other construction work on any day of the preceding twelve months.
2) Building worker (Section 2(e)) refers to a person who is employed to do any skilled, semi-skilled or unskilled, manual, supervisory, technical or clerical work for hire or reward, in connection with any building or other construction work. The terms of employment may be expressed or implied.
3) **Building worker does not include a person:**
   - Who is employed mainly in a managerial or administrative capacity.
   - Who is employed in a supervisory capacity, drawing wages exceeding one thousand six hundred rupees per month or exercises functions that are mainly managerial in nature.
4) Establishment (Section 2(j)) refers to the following:
   - Any establishment belonging to, or under the control of, Government.
   - Any establishment belonging to any body corporate or firm, an individual or association or other body of individuals which or who employs building workers in any building or other construction work.
5) The Central Building and Other Construction Workers' Advisory Committee (Central Advisory Committee) shall be constituted by the central government to advise it regarding the administration of this act. The composition of the committee is as follows:
   - A chairperson to be appointed by the Central Government.
   - Three Members of Parliament of whom two shall be elected by the House of the People and one by the Council of States.
   - The Director-General (ex officio member).
6) The State Building and Other Construction Workers' Advisory Committee (State Advisory Committee) shall be constituted by the state government to advise it regarding the administration of this act. The composition of the state advisory committee is as follows:
   - A chairperson to be appointed by the State Government.
   - Two members of the State Legislature to be elected from the State Legislature.
   - A member to be nominated by the Central Government.
   - The Chief Inspector (ex officio member).
7) In both the Central and State Committees, the members nominated to represent the building workers shall not be less than the number of members nominated to represent the employers.
8) Section 5 of the act is regarding expert committees. As per this section, one or more expert committees shall be constituted by the appropriate government.
   - It shall consist of persons specially qualified in building or other construction work to advise that government for making rules under this act.

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9) An application shall be made by the employer to the registering officer for the registration of an establishment:
- Within sixty days from its commencement, if the act applies on its commencement.
- Within sixty days from the date on which this act becomes applicable, if the act may be applicable at any time after such commencement.

10) To be eligible for getting registered as a beneficiary under this act, a building worker should have completed eighteen years of age but should not have completed sixty years of age.

11) To perform the functions assigned under this act, every State Government shall constitute a Building and Other Construction Workers' Welfare Board. The composition shall consist of:
- A chairperson.
- A person nominated by the Central Government.

12) The Board shall include an equal number of members representing the State Government, the employers and the building workers.
- At least one member of the Board shall be a woman.

13) For the efficient discharge of its functions, the Board shall appoint a secretary and such other officers and employees as it considers necessary.
- The secretary of the Board shall be its chief executive officer.

14) Effective arrangements shall be made by the employer to provide and maintain drinking water at suitable points and no such point shall be situated within six metres of any washing place, urinal or latrine.

15) Suitable rooms for the use of children under the age of six years shall be provided and maintained in every place wherein, more than fifty female building workers are ordinarily employed.

16) The employer shall provide and maintain canteens for the use of workers as per the rules framed by the appropriate government, wherein not less than two hundred and fifty building workers are ordinarily employed, according to the rules framed by the appropriate government.

17) A safety committee shall be constituted in every establishment wherein five hundred or more building workers are ordinarily employed.
- The committee shall consist of representatives of the employer and the building workers.
- The number of persons representing the workers shall not be less than those representing employers.

18) Section 46 of the act is regarding the notice of commencement of building or other construction work. As per this section, an employer shall send a written notice to the inspector at least thirty days before the commencement of any building or other construction work.
- The written notice shall contain the name and situation of the place, the nature of the work involved the arrangements for the storage of explosives, the number of workers, the approximate duration, etc.

19) If any employer fails to give notice of the commencement of the building or other construction work under section 46, he shall be punishable with a maximum imprisonment of three months or with a maximum fine of two thousand rupees, or with both.

Light

Syllabus- Light: Good lighting, natural lighting and artificial lighting. Biological effects of lighting.

Learning objectives- 1. Explain good lighting, natural lighting and artificial lighting 2. Explain the biological effects of lighting.

Light is an essential subject to see, read and understand everything. Requirement of good lighting is possible by arranging some factors that

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helps effectively to reading process. If lighting is not in a good pattern its lead to headache, stress and other fatigue etc. requirement of good lighting is surely needed to run our daily workout without losing efficiency. Some requirements of good lighting are:

1. **Sufficiency illumination :** The first point is sufficiency of lighting. Light need to be sufficient to see objects properly. Insufficient lighting cause to eye strain. About an illumination that comes out from a 15-20 candles are enough as sufficient light.
2. **Uniform Distribution :** The efficient vision without any eye stress is occurs by uniformity inlightdistribution. Light distribution should be proper by establishing the source of light from the left side without the production of shadows is therefore necessary for efficient vision.
3. **Absence of glare :** Glare is high contrast of light. There should be excessive light and high intensity of light cause to glare. For example; automobile headlights at night, same lights during daylight wound not cause glare owing to absence of high contrast. Glare may be direct glare from a light source or reflected glare from source such as table tops and polished furniture. Glare causes annoyance. The eye cannot tolerate glare because it cause acute discomfort and reduces critical vision.
4. **Absences of sharp shadows :** Slight shadows are inevitable, but sharp and contrasting shadows are disturbing. Like Glare, shadows cause confusion to the eye and therefore should not be present in field of vision.
5. **Steadiness of source of light :** Light must be constant with constant contrast and constant intensity. Flickering lights are creating eyestrain and headache.
6. **White Color of light :** The color of light is not very important so long as intensity of these lights are high than normal light. Day light is the sufficient illumination needed by eye to fulfill reading process. Artificial lights should as far as possible approximate the day light color.
7. **Contrast Surroundings :** The term refers to background field of vision. As a requirement to good lighting background has a major role. The walls in your rooms and ceilings are creates reflection and its essential to accumulation of light. If you use glass walls or black backgrounds the efficiency of light should lost. Because glass walls emit the light outside and black background absorbs the light and don't possible reflection. So, surrounding should be in a normal condition by using proper materials cause to reflection.
8. **Angle of light-** Light source should be established in a proper way that lead to effective lighting by reflection. If the light is established in an improper condition there should not reflection and the efficiency will lost. For effective reading light source is better to establish in left side wall than ceiling and other sides.

Measurement of light

Visual light is electromagnetic radiation of wave length band 380-780 nm. There are four measures of importance. For each of these four measures again there are number of term and also great variety of names :

Description	Quantity Measures Name	Recommended Unit	Other Units
Brightness of point source	Luminous intensity	Candela	Candle power
Flow of light	Luminous flux	Lumen	Foot candle
Amount of light reaching surface	Illumination Illuminance	Lux	Lumen/ cm^2
Amount of light re-emitted by surface	Bright luminance	Lambert	Footlambert candle/ cm^2

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Natural lighting

Natural lighting is derived partly from the visible sky and partly from reflection. Light comes to the rooms by reflection from light colour objects. Efficient utilization of natural light calls for careful design, location and orientation of building and relationship between building (town planning). Natural lighting also depends upon the time of the Day, season, weather and atmospheric pollution.

Suggestion for improving daylight illumination

1. **Orientation-** The brightness of the sky is not constant on the east and west and therefore the illumination is subject to variation in buildings facing east and west. The direct penetration of sunlight from east or west may heat up the rooms especially during summer.
2. **Removal of obstructions-** Removal of obstruction item either wholly or partially is likely to give the most effective single improvement in lighting.
3. **Windows-** Windows should be properly planned as the natural lighting within any room is influenced by the amount of visible sky, the size, shape and arrangement of window openings. The rule that window area should not be less than 10 per cent of the floor area.
4. **Interior of the rooms-** The full benefits of the natural illumination, the celling should be white, the upper portion of walls light-tinted, and lower portions somewhat darker so as to give comfortable contrast to the eyes.

Measurement of day light

$$\text{Daylight factors (D.F.)} = \frac{\text{Instantaneous illumination INDOORS}}{\text{Simultaneously occurring illumination OUTDOORS}} \times 100$$

Artificial lighting

Daylight may not meet the requirements of illumination during all hours, and especially during cloudy days. It should be supplemented by artificial illumination for adequate illumination. Artificial lighting should be as close as possible to daylight in composition. There are five systems of artificial lighting

1. **Direct lighting-** in direct lighting, 99 to 100 per cent of the light is projected directly towards the working area. Direct lighting is efficient, economical, but tends to cast sharp shadows. It should not fall into the eyes.
2. **Semi- direct-** in this 10 to 40 per cent of light is project upward and light reflected back on the object by ceiling.
3. **Indirect-** light does not strike a surface directly because 90-100 per cent of the light is projected toward the ceiling and walls. This gives total illumination of the room.
4. **Semi- Indirect-** here 60 to 90 per cent of light is in upward direct and rest downwards.
5. **Direct and Indirect lighting-** light is distributed equally, no one system can recommended to exclusion of others.

Methods of Artificial Illumination

1. **Filament lamps-** They are widely used. The electric current heated up the tungsten filament and the light emitted depended upon the temperature. The hotter filaments produce the bluer light. Accumulation of dust on the bulbs reduces illumination by 30-40 per cent. The bulbs and shades should be cleaned frequently.
2. **Fluorescent lamps-** They are economical in the use of electric current, they are cool and efficient, and the light emitted stimulates natural light. The lamp consists of a glass tube filled with mercury vapor and electrode fitted at each end. The inside of the tube is coated with fluorescent chemicals, which absorb practically all ultraviolet radiation and remit the radiation in the visible range.

Lighting standards

Eye responds to range of illumination ranging from 0.1lux (full moonlight night) to 1,00,000 lux (bright sunshine).

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Visual task	Illumination (Lux)
Casual reading	100
General office work	400
Fine assembly	900
Very severe tasks	1,300-2,000
Watch making	2,000- 3,000

Biological effects of lighting

Considerable attention has been focused on the biological effects of light. The observation that daylight could cause the in vitro degradation of bilirubin is now being used as a therapeutic measure in premature infants with hyperbilibrubnemia. Other biologic effects of light include effect on biological rhythms of body temperature, physical activity, and the stimulation of melanin synthesis, the activation of precursors of vitamin D, adrenocortical secretion and food consumption.

Noise

Syllabus- Noise: Definition of noise and its sources, effects on health and control measures.

Learning objectives- 1. Define noise. Illustrate its sources, effects on health and control measures.

Noise is an unwanted sound, causing disturbance or annoyance to the hearer. Most of us are very used to the sounds we hear in everyday life. Loud music, the television, people talking on their phone, the traffic and even pets barking in the middle of the night. All of these have become a part of the urban culture and rarely disturb us. However, when the sound of the television keeps you from sleeping all night or the traffic starts to give you a headache, it stops becoming just noise and start turning into noise pollution. For many of us, the concept of pollution is limited to nature and resources. However, noise that tends to disrupt the natural rhythm of life makes for one solid pollutant.

By definition, noise pollution takes place when there is either excessive amount of noise or an unpleasant sound that causes temporary disruption in the natural balance. This definition is usually applicable to sounds or noises that are unnatural in either their volume or their production. Our environment is such that it has become difficult to escape noise. Even electrical appliances at home have a constant hum or beeping sound. By and large, lack of urban planning increases the exposure to unwanted sounds. This is why understanding noise pollution is necessary to curb it in time.

Causes of Noise Pollution

1. **Industrialization:** Most of the industries use big machines which are capable of producing large amount of noise. Apart from that, various equipments like compressors, generators, exhaust fans, grinding mills also participate in producing big noise. Therefore, you must have seen workers in these factories and industries wearing ear plugs to minimize the effect of noise.
2. **Poor Urban Planning:** In most of the developing countries, poor urban planning also plays a vital role. Congested houses, large families sharing small space, fight over parking, frequent fights over basic amenities leads to noise pollution which may disrupt the environment of society.
3. **Social Events:** Noise is at its peak in most of the social events. Whether it is marriage, parties, pub, disc or place of worship, people normally flout rules set by the local administration and create nuisance in the area. People play songs on full volume and dance till midnight which makes the condition of people living nearby pretty worse. In markets, you can see people selling clothes via making loud noise to attract the attention of people.
4. **Transportation:** Large number of vehicles on roads, aero planes flying over houses, underground trains produce heavy noise and people get it difficult to get accustomed to that. The high noise leads to a situation where in normal people lose the ability to hear properly.
5. **Construction Activities:** Under construction activities like mining, construction of bridges,

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dams, buildings, stations, roads, flyovers take place in almost every part of the world. These construction activities take place every day as we need more buildings, bridges to accommodate more people and to reduce traffic congestion. The down point is that this construction equipment's are too noisy.

6. **Household Chores:** We people are surrounded by gadgets and use them extensively in our daily life. Gadgets like TV, mobile, mixer grinder, pressure cooker, vacuum cleaners, washing machine and dryer, cooler, air conditioners are minor contributors to the amount of noise that is produced but it affects the quality of life of your neighborhood in a bad way.

While this form of pollution may seem harmless, it in fact has far reaching consequences. The adverse effects on the health of the environment are quite severe. Not only is the local wildlife affected by the pollution, humans also faceas number of problems due to it.

Loudness- Normal conversation produces a noise of 60-85 dB. A daily exposure up to 85 dB is about the limit people can tolerate without substantial damage to their hearing.

Effects of Noise Pollution

1. Auditory effects
2. Non Auditory effects

1. Auditory effects-

a) Auditory fatigue- It appears in the 90dB region and greatest at 400Hz. It may be associated with side effects such as whistling and buzzing in the ears.

b) Deafness- The most serious pathological effects are deafness or hearing loss. The victim is generally unaware of it in early stages. The hearing loss may be temporary or permanent. Temporary hearing loss results from a specific exposure to noise; the disability disappears after a period of time up to 24 hours following the noise exposure. It occurs in frequency range between 4000 to 6000Hz. Repeated or continuous exposure to noise around 100 dB may result in permanent hearing loss. Exposure to noise above 160dB may rapture the tympanic membranes and cause permanent loss of hearing.

2. Non Auditory effects-

a) Interference with speech- Noise interferers with speech communication. In everyday life, the frequencies causing most disturbances to speech communication lie in the 300- 55 Hz range. Noise produce by road and air traffics.

b) Annoyance- this is primarily a psychological response. Neurotic people are more sensitive to noise than balanced people.

c) Efficiency- mental concentration is to be undertaken; a low level of noise is always desired. Reduction in noise has been found to increase work output.

d) Physiological changes- A number of temporary physiological changes occur in human body .These are a rise blood pressure, a rise in an intracranial pressure, an increase in heart rate and breathing and increases in sweating. General symptoms such as giddiness, nausea and fatigue may also occur. Noise interference with sleep, noise is also said to cause for visual disturbance.

e) Besides affecting health, noise is also a significant factor in economic losses.

Control of Noise

1. Careful planning of cities-

a. Division of the city zones with separation of areas concerned with industry and transport.

b. The separation of residential areas from the main streets by means of wide green belts.

c. Widening of main thickly planet with trees and bushes.

2. Control of vehicles- Heavy vehicles should not be routed into narrow streets. Vehicular traffic on residential streets should be reduced. Indiscriminate blowing of the horn and use of pressure horn should be prohibited.

3. To improve acoustic insulation of building-

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From the acoustic standpoint, the best arrangement is construction of detached building rather than a single large building or one that is continuous. Installation that produce noise or disturb the occupants within dwelling should be prohibited.

4. **Industries and railways-** Control of noise at source is possible in industries. Special areas must be earmarked, outside residential areas, for industries for railways, marshaling yards and similar installations.
5. **Protection of exposed persons-** Hearing protection is recommended for all workers who are consistently exposed to noise louder than 85 decibels in the frequency bands above 150 Hz.
6. **Legislation-** Many states are adopted legislation providing for controls which are applicable to a wide variety of sources. Worker have right to claim compensation if they have suffered a loss of ability to understand speech.
7. **Education-** No noise abatement programme can succeed without people's participation. Education through all available media is needed to highlight the importance of noise as a community hazard.

Radiation

Syllabus- Radiation: Radiation - sources and effects on health and control measures.

Learning objectives- 1. Enlist the sources of Radiation and explain its effects on health and describe control measures.

Radiation is the process by which radiant energy is transferred from one place to another in the form of electro-magnetic waves. He various types of radiation differ from one another by their frequency or wavelength. Higher the frequency or lower the wavelength of a radiation, higher will be its energy. Again, higher the energy of the radiation, it will cause higher damage to the living organisms.

Source of radiation exposure

Natural	Man- made
1) Cosmic rays	1) Medical and dental - X-ray, radioisotopes
2) Environmental a) Terrestrial b) Atmospheric	2) Occupational exposure 3) Nuclear - radioactive fall-out
3) Internal- Potassium- 40 Carbon-14	4) Miscellaneous- Television sets, radio-active dial, watches, Isotope tagged products, luminous marker.

1. **Natural sources-** Man is exposed to natural radiation from time immemorial. Natural background radiation arises from three sources.

a) Cosmic rays- The cosmic rays which originate in outer space are weakened as they pass through the atmosphere. At ordinary living altitudes, their impact is about 35 mrad a year. At altitudes above 20 km cosmic radiation becomes important. It has been calculated that a commercial jet pilot receives about 300 mrad per year from cosmic radiation.

b) Environmental –Terrestrial radiation- radioactive elements such as thorium, uranium, radium and an isotope of potassium (K_{40}) are present in man's environment, e.g. soil, rocks, buildings.

c) Atmospheric radiation- the external radiation dose from the radioactive gases randon and thoron in the atmosphere is rather small.

d) Internal radiation- man is also subjected to internal radiation i.e. from radioactive matter stored in the body tissues. These radioactive materials include minute quantities of uranium, thorium, and related substances, and isotopes of potassium, strontium, and carbon.

2. **Man-made sources-**

a) X-rays- the greatest man-made source of radiation exposure to the general population at the present time is medical and dental X-rays. Two distinct group are involved.

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1) patients
2) radiologists and medical technicians

b) Radioactive fallout- nuclear explosions release a tremendous amount of energy in the form of heat, light, ionizing radiation and many radioactive substances, the important being the isotopes of carbon, iodine, cesium and strontium.

c) Miscellaneous – some every day appliances T.V. sets, luminous wrist watches are radioactive. But radiation from source at present is too small to be important.

Type of Radiation

Ionizing radiation is applied to radiation which has the ability to penetrate tissues and deposit its energy within them. Ionizing radiation may be classified into two main groups.

1. Electromagnetic radiation- X-ray and gamma rays
2. Corpuscular radiation- alpha particles, beta particles and photons.

Alpha particles are 10 times as harmful as X-rays, beta particles or gamma rays. Alpha particles, luckily, have little penetrating force.

Radiation units

The activity of a radioactive material is the number of nuclear disintegration per unit of time. The unit of activity is a Becquerel (Bq); 1Bq is equal to 1 disintegration per second.

The potency of radiation is measured in three ways

1. **Roentgen-** It is the unit of exposure. It is the amount of radiation absorbed in air at a given point, i.e. number of ions produced in 1 ml air.
2. **Rad-** Rad is a unit of absorbed dose. It is the amount of radioactive energy absorbed per gram of tissue or any material. 1 mrad= 0.001 rad.
3. **Rem-** Rem is the product of the absorbed dose of potential danger to health. The radiation to which the average citizen is exposed is made up almost of the fast moving, highly penetrating X-rays and gamma rays, where Rem and Rad are equal.

Biological Effects of Radiation

The biologic effects of ionizing radiation may divided into two separate groups

1. **Somatic effects-** A dose of 400 to 500 roentgens on the whole body is fatal in about 50 per cent cases, and 600-700 in practically every case. A dose of 25-50 roentgens to the whole body was found to affect the white blood corpuscles and to produce mild lassitude and softening of the muscles. The delayed effects take time to develop: the latent period may vary from a few weeks to year. It is now fairly well established that delayed effects are mainly of three kinds: leukemia, malignant tumors and shortening of life.
2. **Genetic effects-** While somatic effects are recognized within the life span of irradiated person, genetic effects would be manifest in the more or less remote offspring. Genetic affects results from injury to chromosomes – chromosomes mutations and point mutations. Chromosome mutation is associated with sterility. Point mutation affects the genes.

Radiation Protection and Control

The amount of radiation received from outer space and background radiation has been estimated to be 0.1 Rad a year. Apparently, this does not at present constitute a hazard. The additional permissible dose from man–made sources should not exceed 5 rad a year. Of the man-made sources, the X-rays constitute the greatest hazard.

Preventive measures should be followed to control radioactive pollution.

1. Leakage of radioactive materials from nuclear reactors, industries and laboratories using them should be totally stopped.
2. Radioactive wastes disposal must be safe. They should be changed into harmless form or stored in safe places so that they can decay in a harmless manner. Radioactive wastes only with very low radiation should be discharged into sewerage.

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3. Preventive measures should be taken so that natural radiation level does not rise above the permissible limits.
4. Appropriate steps should be taken against occupational exposure.
5. Safety measures should be taken against accidents in nuclear power plants.

Waste Disposal

Syllabus- Waste disposal: Types of solid waste, Storage and collection of refuse. Methods of disposal of solid waste (Rural & urban). Excreta Disposal methods & Sanitary Latrines. Modern Sewage disposal methods. Disposal methods of Excreta during camps, fairs, and festivals. Bio-medical waste management and Biomedical waste management rules, 2016. Environment protection Act,1986.

Learning objectives- 1. Enlist Different types of solid waste and Explain the Storage and collection of refuse. 2. Explain the Methods of disposal of solid waste (Rural & urban) 3. Describe Bio-medical waste management and Bio-Medical waste management rules, 2016 4. Enlist excreta Disposal methods and explain Sanitary Latrines. 5. Explain the Modern Sewage disposal method. 6. Describe the disposal methods of Excreta during camps, fairs, and festivals

Solid waste

The term solid waste includes garbage (food waste), rubbish (paper, plastics, wood, metal throw away containers, glasses) demolition products (bricks, masonry, pipes) sewage treatment residue, dead animals, manure and other discarded materials. It should not contain night soil. The output of daily waste depends upon the dietary habits, lifestyle, living standards and the degree of urbanization and industrialization. The per capita daily solid waste produced ranges between 0.25 to 2.5 kg in different countries.

Types of wastes

1. Dry refuse or solid waste- This includes all unwanted (or) discarded waste material arising from houses & streets & from commercial, industrial & agricultural activities of man.

It includes public & domestic refuse :

1. Garbage, kitchen waste, leftover food.
2. Rubbish, waste paper, broken glass, bottles and tins, bits of metal, plastic and rags.
3. Ashes from burning wood, charcoal and cow dung fuel.
4. Animal dung.
5. Street sweepings
6. Fallen leaves
7. Dead animals

2. Wet refuse (or) liquid waste (sullage water) in a rural community consists of:

a. Waste water from houses; after bathing, washing clothes, utensils, vegetables etc.
b. Waste from public wells & washing places.
c. Waste from cattle sheds & market places
d. Waste from cottage industries such as dyeing and weaving.

3. Excreta: It implies faeces. The sullage water containing night soil is called sewage.

Waste and health-

1. Hazards of refuse left lying around are:
   - Breeding of flies & other insects and rats.
   - Encouraging of dogs & crows.
   - Growth of bacteria, and spread of infection by means of flies, dust & contamination of water supply.
   - Unpleasant sights & smells.
   - Danger of falls (e.g.) due to fruit skins on paths.
   - Piles of refuse may be a fire hazard.
2. Hazards of liquid waste left as pools of stagnant water are:
   - Mosquito breeding
   - Risk of polluting water supplies
   - Dampness of houses, and danger to foundations of buildings
   - Bad smells
3. Improper disposal of human excreta lead to spread of disease in the following ways:

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- Flies can convey germs & worm ova from faeces to food.
- Drinking water may be contaminated by infected faeces.
- Food may be contaminated by inadequate hand-washing after defecation.
- Vegetable & fruits may be contaminated with worm ova in soil or manure, and eaten rawwithout being washed or cooked.
- Wounds or cracks in the skin may get infected with tetanus from the faeces of man oranimals in soil.

a. Bacterial diseases: Cholera, Typhoid and Paratyphoid fevers, Bacillary Dysentery.

b. Parasitic diseases: Amoebiasis, intestinal worms such as hookworm, round worm &tapeworm.

c. Virus diseases: poliomyelitis & infections hepatitis.

Sources of refuse

1. From street cleansing service or scavenging is called street refuse, usually contains leaves, straw, paper, animal droppings and litter of all kinds.
2. Refuse that is collected from markets called market refuse and contains large proportion of putrefied vegetables and animal matter.
3. Refuse collected from stables called stable litter and contains mainly animal droppings and left over animal feeds.
4. Industrial refuse comprises a wide variety of wastes ranging from inert materials to highly toxic and explosive compounds.
5. The domestic refuse contains ash, rubbish and garbage.

Ash- it is the residue from fire used for cooking and heating.

Rubbish-contains paper, clothing, bids of woods, metal, glass, dust and dirt

Garbage- consists of waste foods, vegetable peelings and other organic matter

Storage

The first consideration should be given to the proper storage of refuse while waiting for collection. A galvanized steel dustbin with closed fitting cover is suitable receptacle for storing refuse. The capacity of a bin depends upon on the number of users and frequency of collection.A recent innovation in the western countries is the paper sack. Refuse store in the paper sack and the sack is removed with the contents for disposal and the new sack is substituted. Public bins cater a larger number of people they are kept on a concrete platform raised 2 to 3 inches above the ground level to prevent flood water entering the bins.

Collection

The method of collection depends on funds available. House to house collection is the best method of collection the refuse. People are expected to dump the refuse in the nearest public bin in places where house to house collection is not available and usually which is not done.

Methods of Disposal

There is no single method of disposal which is equally suitable in all circumstances. The choice of a particular method is governed by local factors such as cost on availability of land and labour. The principle methods of refuse disposal are

1. Dumping
2. Controlled tipping or sanitary land field
3. Incineration
4. Composting
5. Manure pits
6. Burial

A. Dumping

Refuse is dumped in low lying areas partly as a method of reclamation of land but mainly as an easy method of disposal of dry refuse. As a result of bacterial action refuse decreases in volume and converted into humus.

Disadvantages

1. Refuse is exposed to flies and rodents.
2. Source of nuisance from the smell and unsightly appearance
3. Loose refuse is dispersed by the action of wind.

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4. Drainage from dumps contributes to the pollution of surface and ground water.

B. Controlled tipping

Controlled tipping or sanitary land field is the most satisfactory method of refuse disposal where suitable land is available. There are three methods are used in this operation

1. The trench method
2. The ramp method
3. The area method

1. The trench method- a long trench is dug out 2m to 3m deep and 4m to 12m depending upon local conditions. The refuse is compacted and covered excavated earth. Where compacted refuse is placed in the field to a depth o f 2m, it is estimated that one acre of land per year will be required for 10,000 populations.

2. The ramp method- This method is well suited where the terrain is moderately sloping. Some excavation is done to secure the covering material.

3. The area method- This method is used it for filling land depressions, disused quarries and clay pits. The refuse is deposited, packed and consolidated in uniform layers upto 2 to 2.5m deep. Each layer is sealed on its exposed surface with a mud cover at least 30cm thick.

Chemical, bacteriological and physical changes occur in buried refuse. The temperature rises to over 60deg.C within 7days and kills all pathogens and hastens the decomposition process. Then it takes 2 to 3 weeks to cool down. Normally it takes 4 to 6 months for complete decomposition of organic matter into an innocuous mass.

C. Incineration:

Refuse can be disposed of hygienically by burning or incineration. It is the method of choice where suitable land is not available. Hospital refuse which is particularly dangerous is best disposed of by incineration. Disposal of refuse by burning is a loss to the community in terms of the much needed manure.

D. Composting

It is the method of combine disposal of refuse and night soil or sludge. Its process of nature whereby organic matter breaks down under bacterial action resulting in the formation of relatively stable humus like material called the compost which has a considerable manurial value for the soil. The byproducts are Carbon dioxide, water and heat. The methods of composting are

1. Bangalore method (anaerobic method)
2. Mechanical method (aerobic method)

1. Bangalore method

Trenches are dug 90cm deep, 1.5 to 2.5 m broad and 4.5 to 10m long depending upon the amount of refuse and night soil to be disposed of. The pits should be located not less than 800m from city limits. First layer of refuse about 15cm thick is spread on the bottom of the trench. Over this, night soil is added corresponding to a thickness of 5cm. Then alternate layers of refuse and night soil are added respectively till the heap rises to 30cm above the ground level. Within 7 days as a result of bacterial action heat is generated on the compost mass. This heat(over 60deg.C) persists 2 to 3 weeks serves to decomposed the refuse and night soil and destroy all pathogenic and parasitic organisms. At the end 4 to 6 months, decomposition is complete and the resulting manure is well decomposed, odourless, innocuous material of high manorial value ready for application to the land.

2. Mechanical composting

The refuse is first cleared of salvageable materials such as rags, bones, metal, glass and items which are likely to interfere with the grinding operation. It is then pulverized in pulverizing equipment in order to reduce the size of particles to less than 2 inches. The pulverized refuse is then mixed with sewage, sludge or night soil in a rotating machine and incubated. The entire process of composting is complete in 4 to 6 weeks.

E. Manure pits

The garbage, cattle dung, straw and leaves should be dumped into the manure pits and cover

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with earth after each days dumping. To such pits will be needed, when one is closed, the other will be in use. In 5 to 6 months time, the refuse is converted into manure which can be returned to the field. This method of refuse disposal is effective and relatively simple in rural communities where there is no system for collection and disposal of refuse.

F. Burial

This method is suitable for small camps. A trench 1.5m wide and 2 m deep is excavated, and at the end of each day the refuse is covered with 20 to 30 cm earth. When the level in the trench is 40 cm from ground level, the trench is filled with earth and compacted, and new trench is dug out. The contents may be taken out after 4 to 6 months and used on the fields. 1 m length trench will be filled in about 1 week for every 200 person.

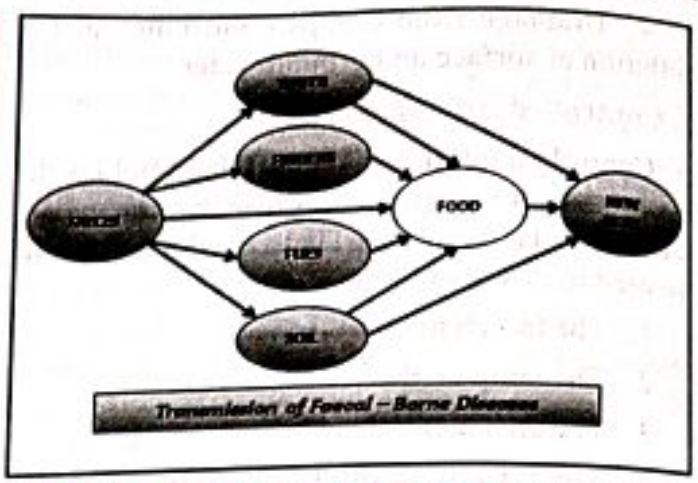
Excreta Disposal- Malanishkasanavyavastha

Human excreta are a source of infection. Improper excreta disposal has various health hazards, soil pollution, water pollution, contamination of foods, propagation of files and Environmental pollution, diseases spread by faecal-oral route. Disposal of human excreta assumes greater importance.

Diseases are typhoid and paratyphoid fever, dysenteries, diarrhoeas, cholera, hookworm disease, ascariasis, viral hepatitis and similar other intestinal infection and parasitic infestations. These diseases are not only burden on the community in terms of sickness, mortality and a low expectation of life, but a basic deterrent to social and economic fundamental environment health services without which there cannot be any improvement in the state of community health.

How disease is carried from excreta-

The human excreta of sick person or a carrier of disease is the main focus of infection. It contains the disease agent which is transmitted to a new host through various channels- 1) water, 2) fingers, 3) flies, 4) soil and 5) food.



Methods of excreta disposal- There are a number of excreta disposal. Some are applicable to unsewered areas, and some to sewered areas.

I. Unsewered Areas

1. Service type latrines (Conservancy System)
2. Non service type (Sanitary latrines)

a. Bore hole latrine
b. Dug well or Pit latrine
c. Water seal type of latrines (PRAI, RCA, Sulabh Shauchalaya)
d. Septic tank
e. Aqua privy

3. Latrine suitable for camps and temporary use

a. Shallow trench latrine
b. Deep trench latrine
c. Pit latrine
d. Bore hole latrine

II. Sewered areas

Water carriage system and Sewage Treatment

a) Primary treatment
- Screening
- Removal of grit
- Palin sedimentation

b) Secondary treatment
- Tricking filters
- Activated sludge process

c) Other methods
- Sea outfall
- River outfall,
- Sewage farming

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• Oxidation pond

Excreta disposal in Unsewered areas

1. Service type latrines (Conservancy System)-

Night soil is removed by a human agency using a bucket or pail is called as service type or conservancy system. Night soil is transported in buckets on the head or in night soil carts manually to a disposal site.Disposal may be done through dumping, composting or burial by shallow trenching.

Night soil lying at home awaiting disposal stinks and attracts flies. The collection, transport and disposal of night soil, all perpetuate the infection cycle. Absence of manpower for this job the entire machinery collapses with direcon-sequences to public health. The Environmental Hygiene Committee, in 1949, that service areas must be replaced by sanitary latrines which require no service, and in which excreta can be disposed off at the site of latrine in a hygienic manner.

2. Non service type (Sanitary latrines)

A sanitary latrine is one which fulfils the following criteria

a) Excreta should not contaminate the ground or surface water.

b) Excreta should not pollute the soil.

c) Excreta should not be accessible to flies, rodents, animals (pigs, dogs, cattle, etc.) and other vehicles of transmission.

d) Excreta should be not creating a nuisance due to odour or unsightly appearance.

Borehole latrines

Borehole latrines have an auger hole instead of a dug pit and may be sunk to a depth of 10 meter or more, although a depth of 4-6 m is usual. Auger holes, 300-500 mm in diameter, may be dug quickly by hand or machine in areas where the soil is firm, stable and free from rocks or large stones. While a small diameter is easier to bore, the life of the pit is very short. For example a 300mm hole 5 m deep will serve a family of five people for about two years.

The small diameter of the hole increases the likelihood of blockage, and the depth of the auger hole increases the danger of groundwater contamination. Even if the hole does not become blocked, the sides of the hole become soiled near the top, making fly infestation probable. However, borehole latrines are convenient for emergency or short-term use, because they can be prepared rapidly in great numbers, and light portable slabs may be used.

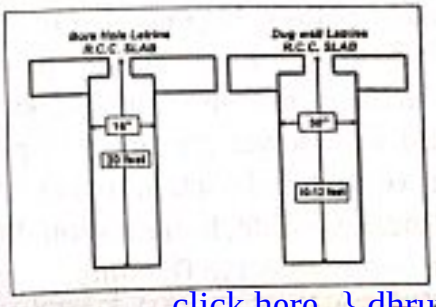
The holes should be lined for at least the top half-metre or so with an impervious material such as concrete or baked clay. Because of the small diameter and short life, the full depth is not usually lined.

Dug well or Pit latrine

Dug well latrine or pit latrine was first introduced in singur, west Bengal in 1949-1950. It is an improvement over the bore hole latrine. A circular pit about 75 cm. in diameter and 3 to 3.5 m deep is dug into the ground for the reception of the night soil. In sandy soil, the depth of the pit may be reduced to 1 to 1.5 m. the pit may be lined with pottery rings, and as many rings as necessary to prevent caving in the soil may be used. A concrete squatting plate is placed on the top of the pit, and the latrine is enclosed with a superstructure.

Advantages

1. It is to construct and no special equipment such as an auger is needed to dig the pit.
2. The pit has a longer life than the bore hole because of greater cubic capacity. A pit 75 cm diameter and 3 to 3.5 m deep will last for about 5 years for a family of 4 to 5 persons. When the pit of the dug well latrine is the same as bore hole latrine, i.e. anaerobic digestion.



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Water seal type of latrines (PRAI, RCA, Sulabh Shauchalaya)

A further improvement in the designing of sanitary latrines for rural families is the hand-flashed "water seal" type of latrine. The squatting plate is fitted with a water seal. The water seal performs two important functions

1. It prevent access by files, night soil is sealed off from flies, by a small depth of water contained in bent pipe called the trap.

2. It prevents escape of odour and foul gases and thereby eliminates the nuisance from smell. Once the latrine is flushed, night soil is no longer visible. These merits have rendered the water seal type of latrine more acceptable to rural people than the bore hole latrine or pit privy without water seal. Several designs of water seal latrines have been tested in the field, and two types have gained recognition for wide use.

a. The P.R.A.I. type evolved by the Planning, Research and Action Institute, Luknow (Uttar Pradesh).

b. The RCA type, designed by the Research-cum-Action project in environment sanitation of the Ministry of Health, Government of India.

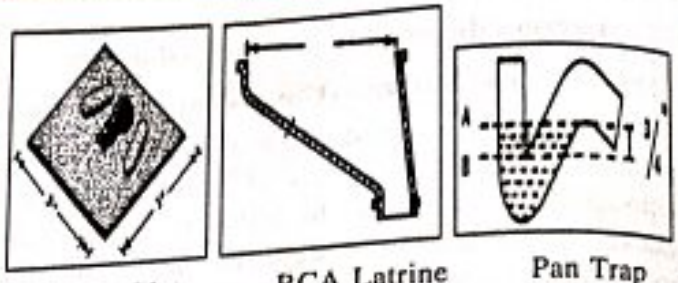
The parts of a water-seal latrine, whether RCA type or PRAI type, are essentially the same. The differences are in matter of minor engineering detail.

The essential features of a RCA latrine and its installation are described below-

RCA Latrine

1.Location

The safe distance between the latrine and a source of water supply will depend upon the porosity of the soil, level of ground water, its slope and direction of flow. In general, it may be stated, that latrines of any kind should not be located within 15 m (50 feet) from a source of water supply, and should be a lower elevation to prevent the possibility of bacterial contamination of the water supply. Where possible, latrines should be located in areas usually subject to flooding.



Squatting Plate RCA Latrine Pan Trap

2. Squatting plate

The squatting plate or slab is an important part of a latrine. It should be made of an impervious material so that it can be washed and kept clean and dry. If kept dry, it will not facilitate the survival of hookworm larvae. In recommending squatting plates, due consideration should be paid to the habits of Indian people who defecate in the squatting position and use water for anal washing. The slab of RCA latrine has been designed to meet the above needs. It is made of cement concrete with minimum dimension of 90 cm (3feet) square and 5 cm thickness at the outer edge. There is a slope ¼ inch towards the pan. This allows drainage into the latrine of water used for ablution or cleansing purpose. A circular squatting plate of 90 cm diameter and 5 cm uniform thickness has also been found satisfactory. For the convenience of the users, raised footrests are included in squatting plate.

3. Pan

The pan receives the night soil, urine and washes water. The length of the pan is 42.5 cm. width of the front portion of the pan has a minimum of 12.5 cm and the width at its widest potion is 20 cm. there is a uniform slope from front to back of the pan. The pan is given a smooth finish.

4. Trap

The trap is a bent pipe, about 7.5 cm in diameter and it is connected with the pan. It holds water and provides the necessary water seal. The water seal is the distance between the level of water in trap and the lowest point in the concave upper surface of the trap. The depth of the water seal in RCA latrine is 2 cm. the water seal prevents the access by flies and suppresses the nuisance from smell.

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5.Connecting pipe

When the pit is dug, away from the squat plate, the trap is connected to the pit by a short length of connecting pipe 7.5 cm in diameter and at least 1meter in length with a bend at the end.

A latrine of the type is called the indirect type because the pit is sited away from the squatting plate. In the direct type there is no need for a connecting pipe. The direct type is best suited for areas where the ground is hard and does not easily cave in. the direct type is cheaper and easier to construct and occupies less space.

An advantage with the indirect type is that when the pit fills up, a second pit can be put into operation by merely changing the direction of the connection pipe. Therefore, the indirect type is usually preferred.

6. Dug Well

The dug well or pit is usually 75 cm in diameter and 3 to 3.5 meter deep and is covered. In loose soil and where the water table is high a lining of earthenware rings or bamboo matting can be used to prevent caving in of the pit. When the pit fills up, second pit is dug nearby and the direction of the connecting pipe is changed into the second pit. When the second pit fills up the first one may be emptied and reused.

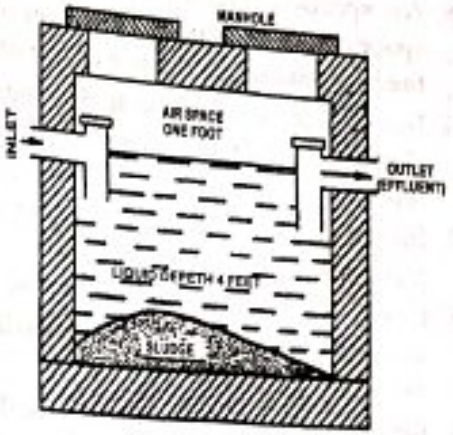
7. Superstructure

The desired type of superstructure may be provided for privacy and shelter. An attractive superstructure with a neat finish is desirable as this will be generally well maintained.

8. Maintenance

The life of a latrine will depend up on several factors such as care in usage and maintenance. The latrine should be used only for the purpose intended and not for disposal of refuse or other debris. The squatting plate should be washed frequently and kept clean and dry. People should learn to flush the pan after use with adequate quantity of water. One to two litres of water are sufficient to flush the RCA latrine. Proper maintenance involves health education of people which is very necessary for the success of any latrine programme.

Septic tank



Septic tank

The septic tank is water-tight masonry tank into which household sewage is admitted for treatment. It is a satisfactory means of disposing excreta and liquid waste from individual dwelling, small group of houses and institutions which have adequate water supplies but do not have access to a public sewage system.

Design features

There are various designs in tanks. Some are double chambered and some single chambered. A single chambered septic tank has been found satifactory for small installations. Tanks wit more than two compartments are expensive and have shown little advantages over the two or multiple chambered septic tank.

The main design features of a septic tank are as follows

1. Capacity- the capacity of septic tank will depend upon the number of user. A capacity of 20-30 gallon or 2 ´-5 c. ft. per person is recommended for household septic tanks. The minimum capacity of a septic tank should be at least 500 gallons. Septic tanks are not recommended for large communities.
2. Length- The length is usually twice the breadth.
3. Depth- The depth of septic tank is from 1.5 to 2 m.

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4. Liquid depth- The recommended liquid depth is only 1.2 m.
5. Air space- There should be a minimum air space of 30 cm between the level of liquid in the tank and undersurface of the cover.
6. Bottom- In some septic tanks, the bottom is sloping towards the inlet end. This facilities retention of solids.
7. Inlet and outlet- There is an inlet and outlet pipe, which are submerged.
8. Cover- The septic tank is covered by a concrete slab of suitable thickness and provided with a manhole.
9. Retention period- Septic tanks are designed in this country to allow a retention period of 24 hours. Too long a retention period will result in undue septicity of the effluent whereas too short a period gives insufficient treatment.

Working of septic tank

The solid settle down in the tank, to form "sludge", while the lighter solid including grease and fat rise to the surface to form "scum". The solid are attracted by the anaerobic bacteria and fungi and are broken down into simpler chemical compounds. This is the first stage of purification, called anaerobic digestion. The sludge is much reduced in volume as a result of anaerobic digestion, and is rendered stable and inoffensive. A portion of solids is transferred into liquids and gases which rises to the surface in the form of bubbles.

The liquid which passes out of the outlet pipe fromtime to time is called the "effluent". It contains numerous bacteriae, cysts, helminthic ova and organic matter in solution or fine suspension. The effluent is allowed to percolate into the sub-soil. It is dispersed by means of perforated or open-jointed pipes laid in treches 90 cm deep and the treanches are then covered with soil. The effluent percolates into the suurounding soil. There are millions of aerobic bacteria in the upper layers of the soil, which attack the organic matter present in the effluent. As a result, the organic matter is oxidized into stable end-products, i.e. nitrates, carbon dioxide and water. This stgae of purification is called aerobic oxidation.

To sum up, two stages are involved in the purification of sewage. The first stage, anaerobic digestion takes place in the septic tank proper, and the second stage, aerobic oxidation takes place outside the septic tank, in the subsoil, together, these two stages complete the purification of sewage.

Operation and Maintenance

1. The use of soap water and disinfectants such as phenol should be avoided as they are injurious to the bacterial flora in the septic tank.
2. Undue accumulation of sludge reduces the capacity of the septic tank and interferes with proper working. Therefore, the contents of septic tank should be bailed out at least once a year. This operation is called "desludging". The bailed out sludge is disposed of by treaching.
3. Newly built septic tanks are first filled with water up to the outlet level and then seeded with ripe sludge drawn from another septic tank, to provide the right type of bacteria to carry out the decomposition process.

Aqua Privy

The aqua privy function like a septic tank and has been used in different regions in the country. The privy consists of a water-tight chamber filled with water. A short length of a drop pipe from the latrine floor dips into water. The shape of the tank may be circular or rectangular. The size of the tank depends upon the number of users. A capacity of one cubic metre is recommended for a small family, allowing 6 years or more for cleansing purpose. Aqua privies are designed for public use also.

Night soil undergoes purification by anaerobic digestion. Since there is evolution of gases, a vent should be provided for the escape of gases into the atmosphere, the vent be open above the roof of dwellings. The effluent is far from innocuous. It contains finely divided faecal matter in suspension and may carry parasitic and infective agents. It should be treated in the same manner as the effluent

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from a septic tank by sub-soil irrigation or absorption. The digestion sludge which accumulates in the tank should be removed at intervals.

Sulbhshauchalaya

The "Sulabh Shauchalaya" model, the invention of a Patna-based firm, is a low cost pour-flush, water-seal type of latrine, which is now being used in many parts of India. Basically it is an improved version of the standard hand flush latrine (e.g. RCA type). It consists of a specially designed pan and water-seal trap. It is connected to a pit 3 feet square and as deep. Excreta undergo bacterial decomposition and are converted to manure. The method requires very little water. Sulabh international, the investors, not only build but also maintain the system of Sulabh community latrines. Their usual structure is a lavatory block of several dozen seats, with a bathing block adjoining. The system is to charge Rs.2 per user. Recently Delhi has opted for this system in all its slums. This system has drawn parse from ecologists and planners.

Chemical closet

It has very limited use under Indian conditions. The closer consists of a metal tank containing a disinfectant fluid. The active ingredients of the fluid are formaldehyde and quaternary ammonium compounds. In addition, a harmless water dye and deodorizing substance are usually incorporated. A seat with cover is placed directly over the tank. Nothing except the toilet paper should be thrown into chemical closet.

Shallow trench latrine

A simple improvement on open defecation fields is to provide shallow trenches in which people can defecate. This allows users to cover faeces and improves the overall hygiene and convenience of an open defecation system. The trench is 30 cm. wide and 90-150 cm deep. Its length depends on the number of users: 3-3.5 m are necessary for 100 people. Separate trench should provide for men and women. The earth from the trench should be piled up at the side. People should be instructed to cover feaces with earth each time they use the latrine.

These instructions may not be carried out, and it will be necessary to post sweeper in attendance to this work. Ablution water should be provided.

Advantages: Rapid to implement (one worker can dig 50m of trench per day); faeces can be covered easily with soil.

Constraints: Limited privacy; short life-span; considerable space required.

Deep trench latrine

Deep trench latrines are often constructed in the immediate stage of an emergency and will be appropriate if there are sufficient tools, materials and human resources available. The trench is 1.8 to 2.5 m deep and 75-90 cm wide. Depending upon the local customs, a seat or a squatting plate is provided. A superstructure is built for privacy and protection. Other requirements are the same as for shallow trench latrine.

Water carriage system

The water carriage system or sewage system implies collecting and transporting of human excreta and waste water from residential, commercial and industrial areas, by a network of underground pipes, called sewers to the place of ultimate disposal. It is the method of choice for collecting and transporting sewage from cities and towns where population density is high. There are two types in water carriage system. The combined sewer system and separate sewer system.

Combined sewer system- the sewer carries both the sewage and surface water.

Separate sewer system- surface water is not admitted into sewer. Separate system is considered the system of choice today. Although the first sewers were laid in 1867 in Calcutta, the Mudaliar Committee reported that not more than 15 per cent of urban population in India had the amenity of a sewerage system.

Elements of water carriage system-

1. Household sanitary fitting(plumbing system of building)
2. House sewers
3. Street sewer or trunk sewers

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4. Sewer appurtenances- manhole traps, etc.

1. Household sanitary fitting-

Where sewers exist, every house is expected to be connected to the nearest sewer. The usual household sanitary fitting are, Water closet, urinal and wash basin.

Water closets- It may be broadly divided into two types- Indian squatting type and Western commode type. An ideal water closet is recommended that for efficient performance.

a. The water seal area should not be more than 7.5 cm.
b. There should not be any sharp corners in the tarp design.
c. The volume of water in trap should be as little as possible, preferably not exceeding 1.75 litres to maintain a minimum of 50 mm deep water seal.
d. Interior of the bowl should be vertical at least 50-75 mm just above the surface of water seal.

The water closets are provided with a flushing rim. Human excreta is directly received into the water in the closet without soiling the sides. The flushing removes all trace of excreta from the side and keeps the closet clean. The closet is connected to a small cistern by a pipe 2.5 to 3.75 cm. in diameter. The flushing cistern normally holds 15 litres of water and works by symphonic action the flushing cistern can be classified as high level, low level and integrated depending upon the height of location above the water closet bowl or pan. The Indian squatting type W.C. pans are used with high level flushing cisterns.

House drain

The house drain is usually 10 cm in diameter and is laid in the courtyard about 15 cm below the ground level on a bed of cement concrete with sufficient gradient towards the main drain. The house drain empties the sewage into the main sewer or public drain.

Public sewer

The trunk sewers are not less than 22.5 cm in diameter; bigger ones may be 2 to 3 m in diameter. They are laid on bed cement concrete, about 3 m below the ground level, with sufficient gradient to ensure what is known as "self- cleansing" velocity; this varies from 2 to 3 feet per second. The trunk sewers collect sewage from several houses and transport to the main outfall or place of final disposal.

Sewer appurtenances

These are manhole and traps which are installed in the sewerage system.

Manholes - Manholes are opening built into the sewerage system. They are placed whenever there is a change in direction of sewers, at meeting point of two or more sewers, at distance of 100 meters in long straight runs. These opening permits a man to enter the sewer for inspection, repair and cleaning. Workers entering the manholes are liable to gas poisoning and asphyxiation. Due precautions should be taken to ensure their safety.

TRAPS are of various kinds, these are devices designed to prevent foul gases entering the houses and remove sand, grit and grease from sewage. Traps are are placed in three situation.

a) Under the basin of water closets,
b) Where the house drain join the public drain,
c) Where surface waste water enters the drains.

Sewage

Sewage is waste water from a community, containing solid and liquid excreta, derived from houses, street and yard washing, factories and industries. It resembles dirty water with an unpleasant smell. The term "sullage" is applied to waste water which does not contain human excreta, e.g. waste water from kitchens and bathrooms. The amount of sewage that flows from sewers depends upon.

a) Habits of the people- if people use more water, there will be more sewage.
b) Time of day- Sewage does not flow uniformly throughout the day.

It is subject to variations depending upon the time of the day and during different seasons. In the morning, when people tend to use more water there

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is greater quantity and flow; in mid-day the flow is less and again there is slight increase in evening. The average amount of sewage which flows through the sewerage system in 24 hours is called the "dry weather flow".

Health aspects

Sewage create environment problems,

a. Creation of nuisance, unsightliness and unpleasant odours.
b. Breeding of flies and mosquitoes.
c. Pollution of soil and water supplies.
d. Increase in the incidence of disease, especially enteric and helminthic diseases.

Composition of Sewage

Sewage contains 99.9 per cent of water. The solids which comprise barely 0.1 per cent are partly organic and partly inorganic. They are partly in suspension and partly in solution. The offensive nature of sewage is mainly due to the organic matter which it contains. The organic matter decomposes according to the laws of the nature during which process it gives off offensive odours. In addition, sewage is charged with numerous living organisms derived from faces, some of which may be agents to disease. It is estimated that one gram of faeces may contain about 1,000 millions of E.coli, 10 to 100 million of faecal streptococci, and 1 to 10 million spores of Cl. Perfringens besides several others. The average adult excretes daily some 100 grams of faeces.

Aim of sewage purification

Raw sewage or inadequately treated sewage should not be discharged into rivers, sea or other source of water supply. This is because, the oxygen in the water supply is used up by the numerous aerobic bacteria found in the sewage. Depletion of oxygen may lead to the death of the plant and animal life in water. Furthermore, the water may yield an offensive smell because of the release of hydrogen sulphide.

The aim of sewage treatment is to "stabilize" the organic matter so that it can disposed off safely; and convert the sewage water into an effluent of an acceptable standard of purity which can be disposed off in to land, rivers or sea. A standard test which is an indicator of the organic content of the sewage is biochemical oxygen demand (BOD).

Biochemical oxygen demand (BOD)

It is the most important test done on sewage. It is defined as the amount of oxygen absorbed by a sample of sewage during a specified period, generally 5 days, at a specified temperature, generally 20 deg. C for aerobic destruction or use of organic matter by living organism. BOD values range from about 1 mg per litre for natural waters to about 300 mg per litre for untreated domestic sewage. If BOD is 300 mg/L and above, sewage is said to be "strong"; if it is 100mg/L it is said to be "weak".

Chemical oxygen demand (COD)

The COD test measure the oxygen equivalent of that portion of the organic matter in a sample which is susceptible to oxidation by a strong chemical oxidiser. If wastes contain toxic substances, this test may be the only practical method for determining the organic load.

Suspended solids

The suspended solids are yet another indicator of the "strength" of sewage. The amount of suspended solids in domestic sewage may vary from 100 to 500 p. p. m. (mg/L). If the amount of suspended solids is 100mg/L, the sewage is said to be weak if amount is 500mg/L the sewage is said to be strong.

Decomposition of organic matter

Aerobic process- it is the most efficient method of reducing the organic matter in sewage. The process requires a continuous supply of free dissolved oxygen. The organic matter is broken down into simple compounds namely CO_2, water, ammonia, nitrites and sulphates by the action of bacterial organisms including fungi and protozoa.

Anaerobic process- where the sewage is highly concentrated and contains plenty of solids, the anaerobic process is highly effective. The end-product of decomposition are methane, ammonia,

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CO_2 and H_2. In anaerobic decomposition,the reaction are slower and the mechanism of decomposition extremely complex.

Modern Sewage Treatment

Modern sewage treatment plants are based on biological principles of sewage purification, where the purification is brought about by the action of anaerobic and aerobic bacteria. The treatment of sewage may divide into to stages, primary treatment and secondary treatment. Primary treatment, the solids are separated from the sewage to anaerobic digestion which is the first stage in purification; in secondary treatment, the effluent is subjected to aerobic oxidation, which is the second stage in purification.

a) Primary treatment-

1. Screening-

Sewage arriving at a disposal work is first passed through a metal screen which intercepts large floating objects such as pieces of wood, rags, masses of garbage and dead animals. Their removal is necessary to prevent clogging of the treatment plant. The screen consists of vertical or inclined steel bars usually set 5 cm apart. In some plants, the screens are of the fixed type while in others, the screens are of the moving type. The screenings are removed from time to time either manually, and disposed off by trenching or burial.

2. Grit chamber

Sewage is then passed through a long narrow chamber called the grit chamber or detritus chamber. This chamber is approximately 10 to 20 metres in length; it is so designed as to maintain a constant velocity of about 1 foot per second, with a detention period of 30 seconds to 1 minute. The function of the grit chamber is to allow the settlement of heavier solids such as sand and gravel, while permitting the organic matter to pass through. The grit which collects at the bottom of the chamber is removed periodically or continuously, and disposed off by plain dumping or trenching.

3. Primary sedimentation

Sewage is now admitted into a huge tank called the primary sedimentation tank. It is a very large tank, holding from to 1/3 the dry weather flow. There are commonest is the rectangular tank. Sewage is made to flow very slowly across the tank at velocity of 1-2 feet per minute. The sewage spends about 6-8 hours in the tank. During this long period of relatively still conditions in the tank, a very considerable amount of purification takes place mainly through sedimentation of suspended matter. Nearly 50-70 per cent of the solids settle down under the influence of gravity. A reduction of between 30 to 40 per cent in number of coli form organisms is obtained. The organic matters which settle down is called sludge and is removed by mechanically operated devices, without disturbing the operation in the tank. While this is going on a small amount of biological action also takes place in which the micro-organisms present in the sewage attack complex organic solids and break them down into simpler soluble substances and ammonia. A certain amount of aft and grease rise to the surface to form scum which removed from time to time and disposed of. When the sewage contains organic trade wastes, it is treated with chemical such as lime, aluminium sulphate and ferrous sulphate. Addition of one of these chemicals precipitates the animal protein material quickly.

b) Secondary treatment

The effluent from the primary sedimentation tank still contains a proportion of organic matter in solution or colloidal state, and numerous living organisms. It has a high demand for oxygen and can cause pollution of soil or water. It is subjected to further treatment, aerobic oxidation, by one of the following methods.

1. Trickling filter method

The trickling filter or percolating filter is a bed of crushed stones or cinker, 1 to 2 m deep and 2 to 30 m in diameter, depending upon the size of the population. The effluent from the primary sedimentation tank is sprinkled uniformly on the surface of the bed by a revolving device. The device consists of hollow pipes each of which have arrow of holes. The pipes keep rotating, sprinkling the

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effluent in thin film on the surface of the filter. Over the surface and down through the filter, a very complex biological growth consisting of algae, fungi, protozoa and bacteria of many kinds occurs. This is known as the "zoogleal layer". As the effluent percolates through the filter bed, it gets oxidized by bacterial flora in zoogleal layer. The action of the filter is thus purely a biological one and not one filtration as the name suggests. The term "filter" is a misnomer. The trickling filters are very efficient in purifying sewage. They do not need rest pauses, because wind blow freely through the beds supplying the oxygen needed by the zoogleal flora. The biological growth or zoogleal layer lives grow and dies. The dead matter sloughs off, breaks away and is washed down the filter. It is a light green, flocculent material and is called "humus". The oxidized sewage is now led into the secondary sedimentation tank or humus tanks.

2. Activated sludge process-

Activated sludge process is the modern method of purifying sewage, in place of the trickling filter. The "heart" of the activated sludge process is the aeration tank. The effluent from the primary sedimentation tank is mixed with sludge drawn from the final settling tank (also known as activated sludge or return sludge; this sludge is rich culture of aerobic bacteria). The proportion of activated sludge to the incoming effluent is of the order of 20 to 30 per cent. The mixture is subjected to aeration in the aeration chamber for 6 to 8 hours. The aeration is accomplished either by mechanical agitation or by forcing compresses air continuously from the bottom of aeration tank. This latter method, also as 'diffuse aeration' is considered a better method of aeration. During the process of aeration, the organic matter of the sewage gets oxidized into carbon dioxide, nitrates and water with the help of aerobic bacteria in activated sludge. The typhoid and cholera organisms are definitely destroyed, and the coli forms greatly reduced. Activated sludge plants occupy's less space, require skilled operations. One acre of activated sludge plant does the work of 10 acres of percolating filter. Activated sludge process is therefore, best suited for large cities and the percolating filter for smaller towns because they are cheaper to install and easier to operate.

Secondary sedimentation-

The oxidized sewage from the trickling filter or aeration chamber is led into the secondary sedimentation tank where it is detained for 2-3 hours. The sludge that collects in the secondary sedimentation tank is called 'aerated sludge' or activated sludge, because it is fully aerated. It differs from the sludge in the primary sedimentation tank in that it is practically inoffensive and is rich in bacteria, nitrogen and phosphates. It is valuable manure, if dehydrated. Part of the activated sludge process and the rest pumped into the sludge digestion tanks for treatment and disposal.

Sludge digestion

One of the greatest problems associated with sewage treatment is the treatment and disposal of the resulting sludge. One million gallons of sewage produces 15-20 tons of sludge. The sludge is thick, black mass containing 95 per cent of water, and it has a revolting odour. There are a number of methods of sludge disposal

a) Digestion- Modern sewage treatment plants employ digestion of sludge as the methods of treatment. If sludge is incubated under favourable conditions of temperature and pH, it undergoes anaerobic auto- digestion in which complex solids are broken down into water, carbon dioxide, methane and ammonia. The volume of sludge is also considerably reduced. It takes 3-4 weeks or longer for complete sludge digestion. The residue is in-offensive, sticky and tarry mud which will dry readily and form excellent manure. Sludge digestion is carried out in special tanks known as "sludge digestion tanks". Methane gas, which is a byproduct of sludge digestion, can use for heating and lighting purposes.

b) Sea disposal - Sea coast town and cities can dispose of sludge by pumping it into the sea.

c) Land Sludge can be disposed of by composing with town refuse.

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Disposal of effluent

1. Disposal by dilution-Disposal into water courses such as rivers and streams is called 'disposal by dilution'. The effluent is diluted in the body of water and the impurities are oxidized by the dissolved oxygen in water. The diluting capacity of the river or the receiving body of water and its dissolved oxygen contents, are important considerations before discharging the effluent into a river or any body of water. Since people use river water for drinking purpose, the effluent must be rendered free from pathogenic organisms by adequate chlorination. The royal commission in England in fifth report in 1908 recommended that an effluent from a sewage treatment plant should be not have more than 30 mg/ litre of suspended solids and the 5 day B. O. D.of the effluent including the suspended matter. Should not exceed 20 mg/ litre. These standards assumed that the river or body of water into which the effluent passed would provide an 8:1 dilution. These standards have been the backbone of subsequent work on the purity of sewage effluent. During the past few years, industry has developed hundred of new chemicals which are released into the sewerage system. Some of these chemicals are not removed by biological treatment. Consequently, the effluent may contain substances toxic to man, or substances that can kill fish, damage agriculture or interfere with the normal functioning of a stream. In many places in the UK, effluent standards have been raised from the original royal commission values of 30 mg per litre of suspended solids and 20 mg per litre of B.O.D. to 10 mg per litre of each. The world health organization is seized with this problem, and is fostering research in "tertiary' methods of treatment or "polishing" the effluent further.

2. Disposal on land- if suitable land is available the effluent can be used for irrigation purposes.

Other methods of sewage disposal

a. Sea outfall
b. River outfall
c. Land treatment
d. Oxidation ponds
e. Oxidation ditches

Sea outfall

Sea coast town and cities may dispose of their sewage by discharging it into the sea. For instance, nearly two-thirds of untreated sewage of greater Mumbai is discharged every day into the Arabian Sea. Purification takes place by dilution in the large body of sea water, and the solids get slowly oxidized. The drawback of this that the offensive solid matter may be washed back to the shore and create public nuisance. In order to prevent this, the sewage outfall is designed to discharge the sewage into deep water at many points.

River outfall

Raw sewage should never be discharged into rivers. The present day practice is to purify the sewage before it is discharged into rivers. How far the sewage should be purified depend upon the dilution the river provides to carry on aeration and self- purification.

Land treatment (sewage farming)

If sufficient and suitable land is available, sewage may be applied to the land grit removal, screening and a short period of settlement. This type of treatment is practiced in some Indian town and cities and is known as sewage farming or broad irrigation. An acre of land would be required to treatment to treat the sewage of 100-300 persons. The land is first laid into ridges and furrows. Sewage is fed into the furrow intermittently and crops are grown on the ridges. The crops that are found suitable to grow are those which do not come in contact with sewage and likely to be eaten raw. Fodder grass and potatoes seem to be the most paying crops fruit trees whose fruits are high above the ground can be grown. But sugar cane, coriander, cucumber, tomato, onion, etc. should not be possible to operate the sewage farms. Badly managed farms stink, a condition described as "sewage sickness" because of lack of sufficient aeration and rest pauses to the land. Alternate

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methods of disposal may have to be provided during the rainy season.

Oxidation Pond

A cheap method of sewage treatment is the oxidation pond which has been referred to by many different names- waste stabilization pond, redox pond, sewage lagoons, etc. the term "waste stabilization pond" is more appropriate. The term waste includes both sewage and industrial wastes. Although an old method of purifying sewage, oxidation pond has attracted the attention of public health engineers only recently. Over 50 ponds are working at present in India. The first large scale installation was the one at Bhilai where it serves a population of 1 lakh.

The oxidation pond is an open, shallow pool 1 to 1.5 m. deep with an inlet and outlet. To qualify as an oxidation pond, there must be the presence of algae, certain types of bacteria which feed on decaying organic matter and sunlight.

The organic matter contained in the sewage is oxidized by bacteria to simple chemical compounds such as carbon dioxide, ammonia and water. The algae, with the help of sunlight, utilize the carbon dioxide, water and inorganic minerals for their growth, thus there is a mutually beneficial biological balance between the algae and bacteria in oxidation ponds. Oxygen that is the needed for oxidation is derived to small extent from the atmosphere but mostly from the algae which liberates oxygen under the influence of sunlight. Sunlight is an important factor in the proper function of oxidation ponds. Clouds weather definitely lower the efficiency of the process.

Oxidation ditches

Other methods recommended are oxidation and aerated lagoons. These methods make use of mechanical rotors for extended aeration. For treatment of the waste of a population between 5,000 to 20,000 an oxidation ditch requires an area of one acre as compared to 22 acre for an oxidation pond and 2.5 acres for an aerated lagoon. These are low-cost treatment methods for the purification of sewage.

Disposal of dead body

The need to properly dispose of a dead body has been a feature of human society for millennia. Everyone is afraid of dead bodies, all religions have viewed the dead as the transitory stage of a permanent life to begin, the life after which is eternity.

Disposal of dead body is the practice and process of dealing with the remains of a deceased human being. Several methods for disposal are practiced. In many cases, the manner of disposal is dominated by spiritual concerns and a desire to show respect for the dead, and may be highly ritualized. Many religions as well as legal jurisdictions have set rules regarding the disposal of corpses.

Disposal of dead is done by various methods -

1. Incineration
2. Burial
3. Water submersion
4. Cannibalism
5. Body donation
6. Body world display
7. Left to be eaten away by vultures/Ariel burial
8. Hydrolysis/dissolution
9. Freezing with liquid nitrogen

The most common methods of disposal are: Burial of the entire body in the earth, often within a coffin.

Cremation- which burns soft tissue and renders much of the skeleton to ash. The remains, known as "cremains" may contain larger pieces of bone which are ground in a machine to the consistency of ash. The ashes may be stored in an urn or scattered on land or water.

Religious and other methods of disposal of dead

Buddhism teach that the dead bodies should be burnt to release the soul which is bad with the hope that they will be reincarnated into a better one

Christianity, especially the Orthodox Church- Teaches that the human body will rise at the second coming of the Lord, to Attain the

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blessedness of the heavenly kingdom together with soul or to suffer the result of rejecting God. Therefore we must respect the body even after death. Respect is shown burying the body and not, to burning it.

In Hinduism- The dead body is considered to be symbol of great impurity, hence minimal physical contact with the dead body is maintained, perhaps to avoid the spread of infections or germs. They burn the body after death. Believing that body is made up from five elements, Panchbhuta; fire, water, air, earth and sound/ether. After burning the remains are spread out in the rivers- water disposal.

In Zoroastrians (Ariel burial) - Fire is considered as god, which is pure. The dead body is impure; they don't want to mix the impure body with the fire. They leave their dead bodies on the top of their temples, to be eaten away by vultures. They believe it is meant for them and they were created for eating the human flesh. Ariel burial is done.

Zoroastrians (known in India as Parsis)-Regard sky burials, in which the bodies are exposed to natural elements including vultures in open-topped "Towers of Silence."

Cannibalism- It is prevalent in Brazil, Africa and parts of India. The dead body is eaten while burning; the Aghori sect in India eats human flesh.

Disposal by water submersion- Recently after the Abbottabad episode the body was disposed of by water submersion. It may happen when an aero plane crash occurs over the oceans; all bodies were washed out or eaten away by sharks or whales. The body decomposition occurs faster in water rather than during earth burial.

Body donation is another way of disposal of body. It is done for the learning and research of medical fraternity. It is a great service for humanity, during life the person is allowed to donate his/her body after their death to a nearby medical hospital or college/research centre. The body is utilized for preparing future doctors/professionals, after being embalmed. RAKCOMS has a plan to start body donation program, another first mile stone to be laid down by RAKMHSU in U.A.E.

Body world display - It is also another way of disposal/ usage of dead. The dead body is preserved by means of plastination process of the entire body after performing desired dissection and attaining different positions and postures. It takes 1000 to 1500 human hours to prepare a body by plastination. The water content of the human body is removed by dehydration and replaced by plastiene substance which prevents decomposition and bacterial infection.

Hydrolysis or dissolution- Disposing of human bodies in a lye solution dissolves tissues into a sterile, syrupy substance that can be safely flushed down a drain. The process, known as alkaline hydrolysis is made use of in the disposal of cadavers. The University of Florida at Gainesville and the Mayo Clinic in Rochester, Minn. the hydrolysis is used to dispose of the cadavers.

Freezing in liquid nitrogen- It involves freezing the body, dipping it in liquid nitrogen and gently vibrating it to shatter it into powder. The technique was conceived by a Swedish biologist, Susanne Wiigh-Masak, who said: "Mulching was natures original plan for us, and that's what used to happen to us at the start of humanity - we went back into the soil.

The most common forms of disposal are burial and cremation.

Burial- Burial usually involves interring the remains in soil that is in a grave in cemetery or churchyard; the term can also refer to any method used to remove the dead body from sight. In earlier times, this may have involved placing the body in a cave or underground burial barrow designed for the purpose. In ancient societies, bodies, especially those of important members of society, might be buried in flamboyant tombs- the most famous of which are the pyramids of ancient Egypt. Other notable forms of burial are bodies interred in catacombs found particularly in Italy but also in other countries in Europe and South America. Catacombs are narrow underground tunnels with built in niches or shelves where the bodies are placed. The most famous catacombs are located in Rome.

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In the old days of the Wild West in the United States, one was buried "6 feet under with his boots on." It is true that graves were 6 feet deep in earlier periods of U.S. history. Today graves less than 6 feet deep - typically 4 and 1/2 feet with 18 inches of soil above the top of the casket.

Burning/ cremation

Cremation is the burning of the human body until its soft parts are destroyed by fire. The skeletal remains and ash residue (cremains) often becomes the object of religious rites, one for the body and one for the bones.

Cremation is an ancient form of bodily disposal that has been used across the world for the last 20,000 years. Cremation uses heat to dispose of the corpses of the dead. In some culture and religious traditions, this is achieved by placing the body on a pyre (a flammable heap of wood and other materials) and setting fire to it. Western societies, cremation uses technology to burn the body in a furnace powered by gas or electricity and takes place in a building designed for purpose a crematorium.

Electric Cremation

The concept of electric cremation is not new. It was commissioned in January 1989 as a part of the Ganga Action Plan. The basic idea was to serve the purpose of river friendly cremation. In order to tackle environmental pollution, electric crematoriums are set up in various parts of the country, especially in the metro cities and are promoted by the Government, private NGOs and environmentalists. The electric system of cremation is used by certain sections of the society only.

Advantages of Electric Cremation

The traditional funeral pyre requires around 500-600 kg of firewood, three litres of kerosene and some prefer ghee, and 300-400 cow dung cakes per dead body. The total costs turn around Rs. 2,000 - 3,000 in total. Mortal remains can be taken only after 24 hours. On the other hand, electric cremation is comparatively less expensive. Relatives can take the mortal remains within a few hours of cremation. In electric cremation, wood is not burned and there are no gas emissions. It is no doubt an unconventional way of cremation but it helps in saving resources like wood, kerosene, etc. It is the most economical option for funeral.

Electric cremation means saving valuable resources like trees and water and saving the environment.

Bio-Medical Waste Management

Biomedical waste is highly potential for infection and injury than any other type of waste. It is essential to have safe and reliable method for its handling. It may also include waste associated with the generation of biomedical waste that visually appears to be of medical or laboratory origin. (e.g. packaging, unused bandages, infusion kits, etc.) Research laboratory waste containing biomolecules or organisms that is restricted from environmental release.

Discarded sharps are considered biomedical waste whether they are contaminated or not, due to the possibility of being contaminated with blood and their propensity to cause injury when not properly contained and disposed of waste sharps include potentially contaminated used (and unused discarded) needles, scalpels, lancets and other devices capable of penetrating skin.

It may be solid or liquid. Examples of infectious waste include discarded blood, sharps, unwanted microbiological cultures and stocks, identifiable body parts, other human or animal tissue, used bandages and dressings, discarded gloves, other medical supplies that may have been in contact with blood and body fluids, and laboratory waste.

Biomedical waste is generated from biological and medical sources and activities, such as the diagnosis, prevention, or treatment of diseases. Common generators (or producers) of biomedical waste include hospitals, health clinics, nursing homes, medical research laboratories, offices of physicians, dentists and veterinarians, home health care, and funeral homes.

Any waste which is generated during the diagnosis, treatment or immunization of human

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eings or animals or in research activities pertaining hereto or in the production or testing of biological and including categories as mentioned in schedule I

Definition

According to Bio-Medical Waste (Management & Handling) Rules, 1998 of India, Bio Medical Waste means any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals, or in research activities pertaining thereto or in the production or testing of biological, and including categories as mentioned in schedule I in table.

Option	Waste category	Treatment and disposal
Category 1	Human anatomical waste (human tissues, organ, body parts)	Incineration burial
Category 2	Animal waste (animal tissues, organs, body parts, carcasses, bleeding parts, fluids)	Incineration burial
Category 3	Microbiology and biotechnology waste (waste from laboratory cultures, stocks or specimens of micro-organism, live or attenuated vaccines)	Local autoclaving microwaving incineration
Category 4	Waste sharps (needles, syringes, scalpels, blades, glass, etc. that may cause puncture and cuts)	Disinfection (chemical treatment/ autoclaving/ Microwaving and mutilation shredding)
Category 5	Discarded medicines and cytotoxic drugs (waste comprising of outdates contaminated and discarded medicines)	Incineration/ drug disposal in secured landfills
Category 6	Solid waste (items contaminated with blood, fluids including cotton, dressing solid plaster casts, linens, beddings)	Incineration/autoclaving/ Microwaving
Category 7	Solid waste (waste generated from disposable items other than the waste sharps such as tubing, cath-eters, intra venous sets etc.)	Disinfection by chemical treat-ment/autoclaving/ microwaving/ mutilation/shredding
Category 8	Liquid waste (waste generated from laboratory and washing, cleaning, housekeeping and disinfecting activities)	Disinfection by chemical treatment (discharge into drains)
Category 9	Incineration ash (ash from incineration of any biomedical waste)	Disposal in municipal landfill
Category 10	Chemical used in production of biological, chemical used in disinfection, as insecticides etc.	Chemical treatment/ discharge in to drains for liquid and secure landfills for solids

Sources of health care waste

The institutions involved in generation of bio medical waste are:

1. Government hospitals
2. Private hospitals
3. Nursing homes
4. Physician's clinic
5. Dentist's clinic
6. Dispensaries
7. PHC
8. Medical research centers
9. Mortuaries
10. Blood banks and collection centers
11. Animal house
12. Slaughter house
13. Laboratories

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14. Research organization
15. Vaccinating centers
16. Bio technology institutions

Health hazards of health care waste

Exposure to health care waste can result in disease or injury due to one or more of the following characteristics,

1. Contains infectious agents
2. Contains toxic or hazardous chemicals or pharmaceuticals
3. Contains sharps
4. It is genotoxic
5. It is radio active

The main group at risk are :

1. Medical doctors, nurses, health care auxiliaries and hospital maintenance personnel.
2. Patients in health care establishment.
3. Visitors to health care establishment.
4. Workers in support service allied to health care establishment such as laundries, waste handling and transportation;
5. Workers in waste disposal facilities such as landfills or incinerators including scavengers.

A. Hazards from infectious waste and sharps : Pathogens in infectious waste may enter the human body through a puncture, abrasion or cut in skin, through mucous membrane by inhalation or by ingestion.

B. Hazards from chemical and pharmaceutical waste : Many of the chemicals and pharmaceuticals used in health care establishment are toxic, genotoxic, corrosive, flammable, reactive, explosive or shock sensitive. Although present in small quantity they may cause intoxication, either by acute or chronic exposure, and injuries, including burns.

C. Hazards from genotoxic waste : The severity of the hazards for health care worker responsible for handling or disposal of genotoxic waste is governed by a combination of the substance toxicity itself and the extant and duration of exposure.

D. Hazards from radioactive waste : The type of disease caused by radioactive waste is determined by the type and extant of exposure. It can range from headache, dizziness and vomiting to many serious problems. Because it is genotoxic, it may also affect genetic material.

E. Public sensitivity : Apart from health hazards, the general public is very sensitive to visual impact of health care waste particularly anatomical waste.

Treatment and disposal technologies for health care waste

Incineration: Incineration is a high temperature dry oxidation process that reduces organic and combustible waste to inorganic incombustible matter and results in a very significant reduction of waste-volume and weight. The process is usually selected to treat waste that cannot be recycled, reused or disposed off in a land fill site.

Types of incinerators

Three basic kinds of incineration technology are of interest for treating health care waste.

1. Double chamber pyrolytic incinerators which may be especially designed to burn infectious health care waste.
2. Single chamber furnaces with a static grate, which should be used only if pyrolytic incinerators are not affordable.
3. Rotary kilns operating at temperatures, capable of causing decomposition of genotoxic substances and heat resistant chemicals.

Chemical disinfection

Chemicals are added to waste to kill or inactivate the pathogens it contains, this treatment usually results in disinfection rather than sterilization. Chemical disinfection is most suitable for treating liquid waste such as blood, urine, stools or hospital sewage.

Wet and dry thermal treatment

Wet thermal treatment: Wet thermal treatment or steam disinfection is based on exposure of shredded infectious waste to high temperature, high

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pressure steam, and is similar to the autoclave sterilization process.

Screw feed technology: It is the basis of a non-burn, dry thermal disinfection process in which waste is shredded and heated in a rotating auger. The waste is reduced by 80% in volume and by 20 – 35 % by weight.

Microwave irradiation

Most microorganisms are destroyed by the action of microwave of a frequency of about 2450MHz and a wave length of 12.24 nm. The water content within the waste is rapidly heated by the microwaves and the infectious components are destroyed by heat conduction.

Land disposal- There are 2 types of land disposal: open dumps and sanitary landfills. Health care waste should not be deposited on or around open dumps.

Sanitary landfills are designed to have at least 4 advantages over open dumps. Geological isolation waste from the environment, appropriate engineering preparation before the sight is ready accepting the waste, staff present on site control operation, organized deposit and daily coverage of waste.

Inertization

The process of inertization involves mixing of waste with cement and other substances before disposal, in order to minimize the risk of toxic substances contained in the waste migrating into surface or ground water. A typical proportion of mixture is 65% medical waste, 15% lime, 15% cement and 5% water.

Advantages & disadvantages of various treatment and disposal options

Treatment method	Advantages	Disadvantages
Rotary kiln Incineration	Adequate for all infectious waste, most chemical waste, and pharmaceutical waste.	High investment and operating costs.
	Significant reduction of weight and volume of waste.	Concern about air emissions.
Controlled air Incineration	Very high disinfection efficiency.	Incomplete destruction of cytotoxics.
	Adequate for all infectious waste and most pharmaceutical and chemical waste.	Relatively high investment and operating costs.
		Concern about air emissions.
Multiple hearth Incineration	Good disinfection efficiency.	Significant emissions of Atmospheric pollutants.
	Significant reduction of weight and volume of waste.	Need for periodic removal of slag and soot.
	The residues may be disposed of in landfills	Inefficiency in destroying thermally resistant chemicals, and drugs such as cytotoxics.
	No need for highly trained operators	
	Relatively low investment and operating costs.	
Chemical Disinfection	Highly efficient disinfection under good operating conditions.	Requires highly qualified technicians for operation of the process.

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	Some chemical disinfectants are relatively inexpensive.	Uses hazardous substances that require comprehensive safety measures and safe disposal.
	Reduction in waste volume.	Inadequate for pharmaceutical, chemical and some types of infectious waste.
Wet thermal Treatment	Environmentally sound.	Shredders are subject to frequent breakdowns and poor functioning.
	Drastic reduction in waste volume.	Operation requires qualified technicians.
	Relatively low investment and operating costs.	Inadequate for anatomical, pharmaceutical, chemical waste and waste that is not readily steam-permeable.
Microwave Irradiation	Good disinfection efficiency under appropriate operating conditions.	Relatively high investment and operating costs.
	Drastic reduction in waste volume.	Potential operation and maintenance problems.
Chemical Disinfection	Environmentally sound. Highly efficient disinfection under good operating conditions. process.	Requires highly qualified technicians for operation of the
	Some chemical disinfectants are relatively inexpensive.	Uses hazardous substances that require comprehensive safety measures and safe disposal.
	Reduction in waste volume.	Inadequate for pharmaceutical, chemical and some types of infectious waste.

Colour coding and type of container for disposal of biomedical waste

Color Coding	Type of Containers	Waste Category	Treatment Options as per Schedule 1
Yellow	Plastic bag	1,2,3,6	Incineration or deep burial
Red	Disinfected Container or Plastic bag	3,6,7	Autoclaving or Micro waving or Chemical Treatment
Blue or White translucent	Plastic bag or puncture proof container	4,7	Autoclaving or Micro waving or chemical treatment and destruction or shredding
Black	Plastic bag	5,9,10 (Solid)	Disposal in secured landfill
Color Coding	Type of Containers	Waste Category	Treatment Options as per Schedule 1

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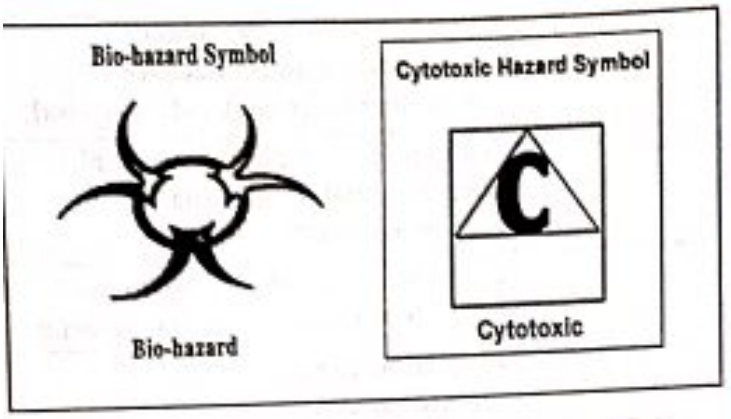

Bio-Medical Waste Management Rules, 2016

Salient Features

1. The ambit of the rules has been expanded to include vaccination camps, blood donation camps, surgical camps or any other healthcare activity;
2. Phase-out the use of chlorinated plastic bags, gloves and blood bags within two years;
3. Pre-treatment of the laboratory waste, microbiological waste, blood samples and blood bags through disinfection or sterilisation on-site in the manner as prescribed by WHO or NACO;
4. Provide training to all its health care workers and immunise all health workers regularly;
5. Establish a Bar-Code System for bags or containers containing bio-medical waste for disposal;
6. Report major accidents; (g) Existing incinerators to achieve the standards for retention time in secondary chamber and Dioxin and Furans within two years;
7. Bio-medical waste has been classified in to 4 categories instead 10 to improve the segregation of waste at source;
8. Procedure to get authorisation simplified. Automatic authorisation for bedded hospitals. The validity of authorization synchronised with validity of consent orders for Bedded HCFs. One time Authorisation for Non-bedded HCFs;
9. The new rules prescribe more stringent standards for incinerator to reduce the emission of pollutants in environment;
10. Inclusion of emissions limits for Dioxin and furans;
11. State Government to provide land for setting up common bio-medical waste treatment and disposal facility;
12. No occupier shall establish on-site treatment and disposal facility, if a service of 'common bio-medical waste treatment facility is available at a distance of seventy-five kilometre.
13. Operator of a common bio-medical waste treatment and disposal facility to ensure the timely collection of bio-medical waste from the HCFs and assist the HCFs in conduct of training.

Understanding The Environment Protection Act, 1986

The Environment Protection Act (1986) is an **umbrella act** that gave the Central Government the right to oversee environmental protection in India. The government can issue rules and directions from time to time and institute authorities to discharge its functions.

"Environment" includes water, air, land, and the inter-relationship which exists among and between water, air, land, and human beings, other living creatures, plants, microorganisms, and property. (Environment Protection Act 1986)

The Central government is also empowered to:

- Plan and execute a nation-wide programme for the prevention, control and abatement of environmental pollution.
- Lay down standards for the quality of environment in its various aspects.
- Lay down standards for emission or discharge of environmental pollutants from various sources.
- The restriction of areas in which any industries, operations or processes or class of industries, operations or processes shall/ shall not be carried out subject to certain safeguards.

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- The Central Government may appoint officers under this Act for various purposes and entrust them with the corresponding powers and functions.
- Restriction on Pollutant Discharge: No individual or organisation shall discharge/emit or permit to discharge/emit any environmental pollutant in excess of the prescribed standards.
- Compliance with Procedural Safeguards: No individual shall handle or shall be caused to handle any hazardous substance except in accordance with the procedure and without complying with the safeguards, as prescribed.

Drawbacks of the Environmental Act

1. Complete Centralisation of the Act.
2. No Public Participation
3. Incomplete Coverage of Pollutants

MCQ On Water

1. Purest water in nature is:
   (a) River water (b) Rain water
   (c) Deep well (d) Impounding reservoirs
2. All the following statements are true about break point chlorination, except:
   (a) Free chlorine is released in water after break point chlorination
   (b) Chlorine demand is the amount needed to kill bacteria, oxidize organic matter and neutralize ammonia
   (c) 1 ppm free chlorine should be present in water after break point has reached
   (d) Contact period of 1 hour is necessary
3. All the following provide evidence of faecal pollution except:
   (a) Faecal streptococci
   (b) Coliform
   (c) Cl. Tetani
   (d) Enterpathogenic virus
4. Per capita allowance of water per day is recommended at:
   (a) 70-80 lit (b) 80-120 lit
   (c) 120-150 lit (d) 150-200 lit
5. Temporary hardness of water is primarily due to the presence of:
   (a) Calcium and magnesium sulphates
   (b) Calcium and magnesium chlorides
   (c) Calcium and magnesium bicarbonates
   (d) Calcium and magnesium nitrates
6. Horrock's apparatus estimates:
   (a) Free chlorine
   (b) Combined chlorine
   (c) (a) + (b)
   (d) Chlorine demand
7. Which one of the following methods is used for the estimation of chlorine demand of water?
   (a) Chlorometer
   (b) Horrock's apparatus
   (c) Berkefeld filter
   (d) Double pot method
8. Orthotoulidine test is used to determine:
   (a) Nitrates in water
   (b) Nitrites in water
   (c) Free and combined chlorine in water
   (d) Ammonia content in water
9. Most desired temperature range for drinking water is:
   (a) 0-5^{0}C (b) 5-10^{0}C
   (c) 10-15^{0}C (d) 15-20^{0}C
10. Most undesirable metal in drinking water is:
    (a) Iron (b) Copper
    (c) Zinc (d) Lead
11. 'Most reliable' evidence of fecal contamination of water is provided by:
    (a) Coliform bacteria
    (b) Cl. Perfringens
    (c) St. fecalis
    (d) Cl. welchii
12. Scabies, an infection of the skin caused by Sarcoptes scabiei, is an example of:
    (a) Water borne disease
    (b) Water washed disease
    (c) Water based disease
    (d) Water related disease

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13. "Safe and Wholesome water" does not include being:
    (a) Free from pathogenic agents
    (b) Free from harmful chemical substances
    (c) Free from colour and odour
    (d) Free from chlorinelth
14. A daily water supply considered adequate to meet the need for all urban domestic purposes is:
    (a) 10 litres per capita
    (b) 20 litres per capita
    (c) 40-60 litres per capita
    (d) 150-200 litres per capita
15. All are "Water-Washed Diseases" except:
    (a) Scabies (b) Trachoma
    (c) Typhoid (d) Conjunctivitis
16. All are true for Rapid Sand Filters except:
    (a) No preliminary storage of raw water is required
    (b) Operation requires highly skilled persons
    (c) Frequent washing is not required
    (d) Can be gravity type or pressure type
17. Disinfecting action of chlorine on water is mainly due to:
    (a) Hydrogen chloride
    (b) Hypochlorous acid
    (c) Hypochlorite ions
    (d) Hydrogen ions
18. Which of the following agents have 'residual germicidal effect' when used for disinfection of water:
    (a) Chlorine only
    (b) Chlorine and Ozone gas
    (c) Chlorine and UV radiation
    (d) Chlorine, Ozone gas and UV radiation
19. Level of hardness in soft water is ___ mEq/ liter:
    (a) Less than 1 (b) 1-3
    (c) 3-6 (d) Over 6
20. Indicator solution in Horrock's Apparatus contains:
    (a) Ortho-toulidine
    (b) Starch iodide
    (c) Ortho-toulidine arsenite
    (d) Bromocresol purple
21. The minimum recommended dose of "free" residual chlorine in water for routine chlorination (in mg/ lts) is
    (a) 0.5 mg/l for a contact period of 1hr
    (b) 0.5 mg/l for a contact period of 1/2 hr
    (c) 1.0 mg/l for a contact period of 1hr
    (d) 1.0 mg/l for a contact period of 1/2 hr
22. True statement regarding chlorination is
    (a) Orthotolidine test measures combined chlorine separately
    (b) Chlorine acts best when pH is around 7
    (c) It kills bacteria, viruses and spores
    (d) Hypochlorite ions are mainly responsible for disinfecting activity
23. Temporary hardness of water is due to presence of:
    (a) Bicarbonates of calcium and magnesium
    (b) Chlorides of calcium and magnesium
    (c) Nitrates of calcium and magnesium
    (d) Oxides of calcium and magnesium
24. When the level of hardness in water is around 150-300 mg / litre it is classified as:
    (a) Very hard water
    (b) Hard water
    (c) Moderately hard water
    (d) Soft water
25. The minimum recommended level of residual chlorine in the drinking water is for one hour:
    (a) 0.25 mg/L (b) 0.5 mg/L
    (c) 1.0 mg/L (d) 2.0 mg/L
26. Chlorine demand estimated by:
    (a) Horrock's apparatus
    (b) Berkefield filter
    (c) Chlorometer
    (d) Double pot method
27. Ortho-toulidine test (OT Test) is used to detect:
    (a) Chlorine (b) Nitrites
    (c) Ammonia (d) Nitratesx

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28. In a slow sand filter, the element responsible for yielding bacteria free water is the:
(a) Valve
(b) Vital layer
(c) Supernatant water
(d) Under-drainage system

29. True about slow sand filter is:
(a) Occupies less space
(b) More expensive
(c) Requires longer duration
(d) Sand size 0.4-0.7 mm

30. Softening is recommended when hardness of water is more than:
(a) 50 mg/litre (b) 75 mg/litre
(c) 100 mg/litre (d) 150 mg/litre

31. The vital layer in a slow sand filter is:
(a) Sand bed (b) Under drainage
(c) Zoological layer (d) Supernatant

32. Hardness of drinking water should be:
(a) >3 (b) <1
(c) 1-3 (d) ≥3

33. Disinfecting action of chlorine is due to:
(a) Hypochlorous acid
(b) Hypochlorite ion
(c) Hydrochloric acid
(d) Both hypochlorous acid and hypochlorite ion

34. A chloride level_____ is said to be accepted by WHO:
(a) 0.2 mg/L (b) 0.5 mg/L
(c) 45 mg/L (d) 200 mg/L

35. Safe water criteria EXCEPT:
(a) Free from pathogens
(b) Free from harmful chemicals
(c) Free from chlorine
(d) Free from colour and odour

36. Method of choice for purification of highly polluted water on a large scale is
(a) Boiling
(b) Chlorination
(c) Super chlorination followed by dechlorination
(d) Ultraviolet light treatment

37. Most effective water treatment method in rural area:
(a) Rapid sand filter
(b) Slow and filter
(c) Chlorination of water
(d) Ozonization

38. One tablet of chlorine is effective to disinfect how much quantity of water:
(a) 5 L (b) 10 L
(c) 20 L (d) 30 L

39. Criteria for safe drinking water:
(a) pH 6.5-8.5 (b) Chloride 0.8 g/L
(c) Nitrate 0.2 g/L (d) Solids-12000 mg/L

Answers of MCQ on Water

1. Ans. (b) Rain water
2. Ans. (c) 1 ppm free chlorine should be present in water after break point has reached
3. Ans. (c) Cl. Tetani
4. Ans. (d) 150-200 lit
5. Ans. (c) Calcium & magnesium bicarbonates
6. Ans. (d) Chlorine demand
7. Ans. (b) Horrock's apparatus
8. Ans. (c) Free and combined chlorine in water
9. Ans. (b) 5-10°C
10. Ans. (d) Lead
11. Ans. (a) Coliform bacteria
12. Ans. (b) Water washed disease
13. Ans. (d) Free from chlorine
14. Ans. (d) 150-200 litres per capita
15. Ans. (c) Typhoid
16. Ans. (c) Frequent washing is not required
17. Ans. (b) Hypochlorous ac
18. Ans. (a) Chlorine only
19. Ans. (a) Less than 1
20. Ans. (b) Starch iodide
21. Ans. (a) 0.5 mg/l for a contact period of 1hr
22. Ans. (b) Chlorine acts best when pH is around 7

23. Ans. (a) Bicarbonates of calcium and magnesium
24. Ans. (b) Hard water
25. Ans. (b) 0.5 mg/L

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26. Ans. (a) Horrock's apparatus
27. Ans. (a) Chlorine
28. Ans. (b) Vital layer
29. Ans. (c) Requires longer duration
30. Ans. (d) 150 mg/litre
31. Ans. (c) Zoological layer
32. Ans. (c) 1-3
33. Ans. (a) Hypochlorous acid
34. Ans. (d) 200 mg/L
35. Ans. (c) Free from chlorine
36. Ans. (c) Super chlorination followed by dichlorination
37. Ans. (c) Chlorination of water
38. Ans. (c) 20 L
39. Ans. (a) pH 6.5-8.5

MCQ on Air

1. Psychrometer is used to measure:
   (a) Humidity (b) Air velocity
   (c) Room temperature (d) Radiant heat
2. All of the following are types of mechanical ventilation except:
   (a) Perflation and Aspiration
   (b) Exhaust ventilation
   (c) Plenum ventilation
   (d) Air conditioning
3. All are indicators of air pollution except:
   (a) Soiling index
   (b) McArdle's index
   (c) Suspended particle count
   (d) SO2 Concentration
4. McArdle's maximum allowable sweat rate is:
   (a) 4 lit /4 hours (b) 4 lit /1 hours
   (c) 4.5 lit/4 hours (d) 4.5 lit/8 hours
5. Indoor air pollution does not cause:
   (a) Chronic lung disease
   (b) Pregnancy problems
   (c) Childhood pneumonia
   (d) Neuro-developmental problems
6. Number of air changes in one hour in a drawing room should be at least:
   (a) 2 (b) 3
   (c) 4 (d) 5
7. Number of air changes in a drawing room per hour should be at least:
   (a) 2-3 (b) 3-4
   (c) 4-5 (d) 5-6
8. Number of air changes in one hour in a work room should be at least:
   (a) 2-3 (b) 3-4
   (c) 4-6 (d) 5-7
10. The best parameter to measure air pollution is:
    (a) SO_2 (b) CO_2
    (c) CO (d) N_2O
11. The best indicator of air pollution is:
    (a) SO_2 (b) CO_2
    (c) CO (d) N_2O
12. Acceptable level for physical comfort:
    (a) Corrected effective temperature 79^0F
    (b) Corrected effective temperature $70\text{-}76^0F$
    (c) Corrected effective temperature $80\text{-}81^0F$
    (d) Corrected effective temperature $> 82^0F$
13. The effective temperature of 'comfort zone' is:
    (a) $69 - 76^0F$ (b) $77 - 80^0F$
    (c) $83 - 85^0F$ (d) $86 - 90^0F$
14. In Indoor air pollution, carbon monoxide is produced by:
    (a) Combustion equipment
    (b) Stove
    (c) Gas heaters
    (d) All of the above

Answers of MCQ on Air

1. Ans. (a) Humidity
2. Ans. (a) Perflation and Aspiration
3. Ans. (b) McArdle's index
4. Ans. (c) 4.5 lit/ 4 hours
5. Ans. (d) Neuro-developmental problem
6. Ans. (a) 2

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7. Ans (a) 2 - 3
8. Ans (c) 4 - 6
9. Ans. (a) SO_2
10. Ans. (a) SO_2
11. Ans. (a) 79^0F
12. Ans. (a) 79^0F
13. Ans. (b) $77\text{-}80^0F$
14. Ans. (d) All of the above

MCQ on Noise

1. Whispering produces a sound of:
   (a) 20-30 dB (b) 30-40 dB
   (c) 40-50 dB (d) 50-60 dB
2. Exposure to following minimum level of sound can cause rupture of tympanic membrane, leading to permanent hearing loss:
   (a) 90 dB (b) 110 dB
   (c) 160 dB (d) 1600 dB
3. An upper limit of noise which people can tolerate without damage to their hearing is:
   (a) 45 db (b) 65 db
   (c) 85 db (d) 105 db
4. Exposure to noise above..... cause permanent loss of hearing:
   (a) 85 dB (b) 90 dB
   (c) 100 dB (d) 160 dB
5. The decibels above which auditory fatigue occurs is:
   (a) 60 db (b) 70 db
   (c) 85 db (d) 140 db
6. Exposure to noise above _____ causes permanent loss of hearing:
   (a) 85 dB (b) 90 dB
   (c) 100 dB (d) 160 dB
7. The 'acceptable' noise level is:
   (a) 85 dB (b) 90 dB
   (c) 95 dB (d) 100 dB
8. Pain in the ear occurs at:
   (a) 80 dB (b) 120 dB
   (c) 140 dB (d) 160 dB
9. Highest permissible intensity of sound is: [MP 2003]
   (a) 65 dB (b) 85 dB
   (c) 90 dB (d) 80 dB
10. Repeated exposure to_____ can cause permanent deafness is:
    (a) 160 dB (b) 60 dB
    (c) 90 dB (d) 100 dB
11. Upper limit of exposure to noise up to which there is no damage to hearing?
    (a) 160 dB (b) 70 dB
    (c) 85 dB (d) 100 dB

Answers of MCQ on Noise

1. Ans. (a) 20-30 dB
2. Ans. (c) 160 dB
3. Ans. (c) 85 db
4. Ans. (c) 100 dB
5. Ans. (c) 85 db
6. Ans. (c) 100 dB
7. Ans. (a) 85 dB
8. Ans. (c) 140 dB
9. Ans. (b) 85 dB
10. Ans. (d) 100 dB
11. Ans. (c) 85 dB

MCQ on Light/Housing

1. Recommended illumination range for regular work is _____ foot-candles:
   (a) 6-12 (b) 25-50
   (c) 50-75 (d) 75-100
2. Day light factor in living room should be:
   (a) 8% (b) 6%
   (c) 10% (d) 15%
3. The optimum floor space recommended per adult person in a dwelling place is:
   (a) 50-100 sq.ft. (b) 101-450 sq.ft.
   (c) 151-200 sq.ft. (d) 201-250 sq.ft.
4. The optimum floor space recommended per adult person in a house
   (a) 70-90 sq. ft. (b) 101-150 sq.ft.
   (c) 151-200 sq.ft. (d) 201-250 sq. ft.

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Answers of MCQ on Light, Housing

1. Ans. (a) 50-100 sq.ft.
2. Ans. (a) 8%
3. Ans. (a) 50-100 sq.ft.
4. Ans. is (a) 70-90 sq. ft.

MCQ on Waste Disposal

1. All of the following are methods of sewage disposal except:
   (a) River outfall
   (b) Land treatment
   (c) Oxidation ponds
   (d) Bangalore method (Composting)
2. Waste water from kitchen is called:
   (a) Refuse (b) Garbage
   (c) Sullage (d) Sewage
3. The amount of sewage flowing in a system in 24 hours is called:
   (a) Sewage rate (b) Dry weather flow
   (c) RCA index (d) Sludge
4. A good trap should have effective seal of:
   (a) 2.5 cm (b) 5 cm
   (c) 7.5 cm (d) 10 cm
5. All are features of septic tank except:
   (a) Ideal retention period - 48 hrs
   (b) Minimum capacity - 500 gallons
   (c) Aerobic oxidation takes place outside
   (d) Sludge is solids setting down
6. Sullage consists of:
   (a) Solid vegetable waste matter
   (b) Inorganic waste
   (c) Waste containing human excreta
   (d) Waste water from kitchen
7. Most satisfactory method of Refuse disposal is:
   (a) Dumping (b) Controlled tipping
   (c) Incineration (d) Manure pits
8. The depth of Water Seal in RCA Latrine is:
   (a) 1 cm (b) 2 cms
   (c) 5 cms (d) 12 cms
9. Strength of sewage is expressed in terms of all except:
   (a) E-Coli Count
   (b) Suspended particles
   (c) Chemical oxygen demand
   (d) Biological oxygen demand
10. The biological oxygen demand (BOD) indicates:
    (a) Organic matter
    (b) Bacterial content
    (c) Anaerobic bacteria
    (d) Chemicals
11. Waste water without human excreta is called:
    (a) Sewage (b) Humus
    (c) Sullage (d) Effluent
12. Following latrines are suitable for camps and temporary use except:
    (a) Shallow trench latrine
    (b) Pit latrine
    (c) Borehole latrine
    (d) Septic tank
13. Biochemical oxygen demand is calculated to know:
    (a) Organic waste (b) Inorganic waste
    (c) Total solids (d) Toxic substances
14. Following are the waste types not to be incinerated except:
    (a) Pressurized gas containers
    (b) Reactive chemical waste
    (c) Halogenated plastics
    (d) Content of combustible matter above 60%
15. The sewage ground water is disposed by: *[DNB 2002]*
    (a) Oxidation pond
    (b) Soakage pit
    (c) Activated sludge process
    (d) Any of the above
16. If land is available the ideal method of disposal is:
    (a) Composting (b) Incineration
    (c) Controlled tipping (d) None

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17. Not a feature of septic tank:
    (a) Used for personal and small public use
    (b) Water tight compartment
    (c) Used where water supply is adequate
    (d) Used where public sewerage system is adequate
18. Trickling filter is used in:
    (a) Primary treatment of sewage
    (b) Secondary treatment of sewage
    (c) Sewage effluent treatment
    (d) Sewage farming treatment
19. Best method for disposal of refuse where land is available:
    (a) Burial (b) Dumping
    (c) Manure pit (d) Controlled tipping
20. Most important prerequisite in sanitary latrine is:
    (a) Water seal
    (b) Adequate drainage
    (c) Squatting plate/slab
    (d) Smooth slope of the pan
21. Septic tank true is:
    (a) Always double chamber
    (b) Minimum 200 galon capacity
    (c) Depth is from 5-7 feet
    (d) Retention period is of 24 hrs
22. The function of grit chamber in modern sewage plants is:
    (a) Formation of sludge
    (b) Removal of floating large objects
    (c) Settlement of heavy objects
    (d) Formation of Zoogleal layer
23. All the following wastewater contains human excreta except:
    (a) Sewage (b) Sullage
    (c) Faeces (d) None
24. Strength of sewage is expressed in terms of all except:
    (a) Biological Oxygen Demand
    (b) Chemical oxygen demand
    (c) Suspended solids
    (d) Coliform count
25. Sullage in rural area is disposed by:
    (a) Gobar gas plant (b) Septic tank
    (c) Sewage system (d) Incineration
26. Water not containing feces:
    (a) Sewage (b) Sullage
    (c) Both (d) None of these
27. Poliovirus transmission does not occur through:
    (a) Sewage (b) Sullage
    (c) Both (d) None of these

Answers of MCQ on Waste Disposal

1. Ans. (d) Bangalore method (Composting)
2. Ans. (c) Sullage
3. Ans. (b) Dry weather flow
4. Ans. (a) 2.5 cm
5. Ans. (a) Ideal retention period - 48 hrs
6. Ans. (d) Waste water from kitchen
7. Ans. (b) Controlled tipping
8. Ans. (b) 2 cms
9. Ans. (a) E-Coli Count
10. Ans. (a) Organic matter
11. Ans. (c) Sullage
12. Ans. (d) Septic tank
13. Ans. (a) Organic waste
14. Ans. (d) Content of combustible matter above 60%
15. Ans. (c) Activated sludge process
16. Ans. (c) Controlled tipping
17. Ans. (d) Used where public sewerage system is adequate
18. Ans. (b) Secondary treatment of sewage
19. Ans. (d) Controlled tipping
20. Ans. (a) Water seal
21. Ans. (d). Retention period is of 24 hrs
22. Ans. (c) Settlement of heavy objects
23. Ans. (b) Sullage
24. Ans. (d) Coliform count
25. Ans. (a) Gobar gas plant
26. Ans. (b) Sullage
27. Ans. (b) Sullage

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Chapter 13

Disaster Management

Syllabus

Definition of disaster and disaster management. Effects of natural and man-made disasters. Epidemiologic surveillance and disease control measures.

Learning objectives

1. Define disaster and explain disaster management
2. Explain effects of natural and man-made disasters
3. Explain epidemiologic surveillance and identify disease control measures

Total - 3 hours (Lecture :1 hour, Non-lecture: 2 hours)
MCQ- Yes- SAQ (5 Marks)- Yes- LAQ (10 Marks)- No

Introduction

Disasters and other emergencies often result in significant impacts on people's health, including the loss of many lives. Every new threat reveals the challenges for managing health risks and effects of emergencies and disasters. Deaths, injuries, diseases, disabilities, psychosocial problems and other health impacts can be avoided or reduced by disaster risk management measures involving health and other sectors.

There are many types of disasters such as earthquakes, cyclones, floods, tidal waves, landslides, volcanic eruptions, tornadoes, fires, hurricanes, snow storms, severe air pollution (smog), heat waves, famines, epidemics, building collapse, toxicologic accidents (e.g. release of hazardous substances), nuclear accidents and warfare etc. Warfare is a special category, because damage is the intended goal of action. Every catastrophic event has its own special features. Some can be predicted several hours or days beforehand, as in the case of cyclones or floods, others such as earthquakes occur without warning.

Definition of disaster and disaster management

A **"Disaster"** can be defined as "any occurrence that causes damage, ecological disruption, loss of human life or deterioration of health and health services on health services on a scale sufficient to warrant an extraordinary response from outside the affected community or area".

A **"hazard"** can be defined as any phenomenon that has the potential to cause disruption or damage to people and their environment.

Natural, biological, technological and societal hazards put the health of vulnerable populations at risk and the potential to cause significant harm to public health.

Examples of these hazards are as follows:

Natural: earthquake, landslide, tsunami, cyclones, flood or drought.

Biological: epidemic disease, infestations of pests.

Technological: chemical substance, radiological agents, transports crashes.

Societal: conflict, stampedes, acts of terrorism.

Classification of Disasters-

1. Natural Disasters
2. Man Made Disasters

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Natural Disasters

A. Natural phenomena beneath Earth's surface

1. **Earth quake-** These are due to interactions at the edge of great plates of the earth, which make up the surface of the world. Usually, they occur in well-defined bolts. However, no country is immune to this. The high level of mortality in earth-quake is due to collapse of the buildings. Consequently, the tragedy will be more when earthquake occurs at night.
2. **Tsunamis-** These are due to earthquakes under the sea. This results in displacement of large volume of water causing waves of low amplitude but of long wavelengths, resulting in floods on the coastal lands. Thus, damage and loss of life can occur at great distances from the point of origin of the wave. Indian state of Tamil Nadu was impacted by the recent tsunami tragedy that originated in Indonesia in 2004.
3. **Volcanic eruptions-** There will be mud-slides and glowing clouds. 23,000 deaths occurred following mud-slides in Columbia in 1985 and 30,000 deaths following glowing clouds at Saint Pierre in Martinique. There will be injuries, burns and suffocation. Volcanic soils are highly fertile. So, often they are densely populated, e.g. Merapi Volcano in Central Jawa.

B. Natural phenomena at Earth's surface

1. **Land slides-** An avalanche is a mass of snow which is set in motion by its own weight through a violet disturbance of its equilibrium. Such avalanches are common in all mountainous area, where slopes are sufficiently steep and the precipitation is in the form of snow. There are two kinds of avalanches – the surface avalanch in which only the top covering of the snow slips and the ground avalanch in which the whole mass is carried away.
2. **Avalanches-**

a. **Powder snow avalanche:** This usually occurs in winter season, after a fresh fall of snow. It becomes detached following a strong wind or the blast of another avalanche. It can flatten quite a large tract of forest.

b. **Fresh wet snow avalanche:** This moves a little slower than a powder snow avalanche. Consequences are same but in addition it has a crushing effect because of its weight. On coming to a halt it hardens immediately like a plaster.

c. **Wet snow avalanche:** It is mainly a spring time avalanche. It flows slowly but its force is considerable. It flattens and destroys everything. 1 cu.mtr of powder snow weighs about 1 kg while the same volume of wet snow weighs several hundred kilograms.

d. **Snow slab avalanche:** In this type, the upper layer of snow is compressed and is separated from the underlying snow by a layer of air. It is difficult to recognize.

e. **Sea/River avalanche:** It is caused by movement of glacier.

C. Natural phenomena above Earth's surface

a. **Meteorological (Hydrological) phenomena**

i. **Windstorms (Cyclone, Typhoon, Hurricane)-** This begins as low-pressure area in equatorial latitude. Severe winds occur in a circular band. The speed is highest in the centre and lowest in the periphery. The speed will be about 60 km/ hour. The threat of cyclones is only in coastal areas. This is associated with heavy rains causing danger to the life.

ii. **Tornadoes-** A tornado is like a cyclone, a vortex of air, but on a much smaller scale. The velocity of air raising in the centre may be very high and is responsible for damage. Big objects may be vacuumed from the ground. While crossing an urban area, it may totally destroy the building.

iii. **Hailstorms (or Snow storms)-** Hail is a type of solid rain made up of balls or lumps of ice. Storms that produce hail which reaches the ground are known as hailstorms. They typically last for no more than 15 minutes but can cause injuries to people and damage buildings, vehicles and crops.

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iv. **Sea-surges-** A storm surge is a sudden rise of water hitting areas close to the coast. Storm surges are usually created by a hurricane or other tropical cyclone. The surge happens because a storm has fast winds and low atmospheric pressure.

v. **Floods-** These are commonest of all natural disasters and cause greater deaths than any other type of disaster. Reasons are overflow of rivers, heavy rainfall, melting of snow, breaking of dams and glacial lakes, cyclonic storm-surge and tsunami.

vi. **Droughts-** A prolonged period of abnormally low rainfall, leading to a shortage of water.

b. Biological phenomena

i. Epidemics of diseases

ii. Locust swarms (group of insects/bees)

Man-Made Disaster

A man-made disaster is a disaster resulting from human intent, negligence or error. Man- made disaster can be both intentional and unintentional. It results in huge loss of life and property. It further affects a person's mental, physical and social well-being.

D- Detection
I-Incident command
S- Safe and security
A-Assess hazards
S-Support
T-Triage and treatment
E-Evacuation
R- Recovery

A. Caused by Warfare

1. Conventional
2. Nuclear
3. Biological
4. Chemical

B. Caused by accidents

1. Vehicular – Air crafts, Train, Ship, Four wheelers, Two wheelers.
2. Drowning
3. Collapse of the building
4. Explosions
5. Fires
6. Biological
7. Chemicals including poisoning

Reasons for man-made disaster- Reasons for man-made disaster- There are multiple factor that may relate to manmade disasters, ignorance, unawareness, illiteracy, carelessly handling danger, chemical and weapons.

Nuclear Disaster – nuclear disaster is the type of disaster that falls in this category is nuclear bomb. When this occurs, it is often as result of intent and the end results are even more catastrophic with a large percentage of those involved losing their lives.

Chemical disaster or industrial disaster- Chemical disaster or industrial disaster- By the nature, the manufacture storage and transports of chemical are accidents waiting to happen. Chemical can be toxic and they may react often explosively. Sudden disaster also as Bhopal Gas Tragedy in India on 3rd December 1984 in which a leakage in the storage tank of Union Carbide Pesticide Plant released tons of methyl isocyanate into the air. Insidious disaster, such as insidious chemical exposure and insidious radiation exposure, as in nuclear weapons production factories, research laboratory resulting in release of radioactive substances into the air.

Fire DisasterFire Disaster- Bush fires, forest fires and mine fires are generally stared by lighting, but also human negligence or arson. They can burn thousands of square kilometres.

Disasters, emergencies, and other crises may cause ill-health directly or through the disruption of health systems, facilities and services, leaving many without access to health care in times of emergency. They also affect basic infrastructure such as water supplies and safe shelter which are essential for health.

Natural Disasters- Over a twenty-year period, in excess of 8500 natural disasters occurred, affecting more than 2.6 billion people. The incidence of natural disasters has been increasing and the impact of climate change will be to increase

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the risk for millions of individuals, their homes, their communities, and the infrastructure that supports them.

Biological Disasters- During the last few decades, biological emergencies have assumed an increasing importance: major outbreaks related to new and re-emerging infectious diseases such as SARS, influenza (H1N1 and H5N1) and cholera.

Technological disasters- The International Federation of the Red Cross has estimated that between 1998 and 2007, there were nearly 3200 technological disasters with approximately 100000 people killed and nearly 2 million people affected.

Societal Disasters - Complex emergencies, including conflict, continue to affect tens of millions of people, causing displacement of people both inside and across borders. In 2010 there were an estimated total of 27 million persons who remained internally displaced by armed conflict across the world.

Disaster Management

The mitigation and preparedness phases occur as disaster management improvements are made in anticipation of a disaster event. Developmental considerations play a key role in contributing to the mitigation and preparation of a community to effectively confront a disaster. As a disaster occurs, disaster management actors, in particular humanitarian organizations become involved in the immediate response and long-term recovery phases. The four disaster management phases illustrated here do not always, or even generally, occur in isolation or in this precise order. Often phases of the cycle overlap and the length of each phase greatly depends on the severity of the disaster.

Mitigation - Minimizing the effects of disaster. Examples: building codes and zoning; vulnerability analyses; public education.

Preparedness - Planning how to respond. Examples: preparedness plans; emergency exercises/training; warning systems.

Response - Efforts to minimize the hazards created by a disaster. Examples: search and rescue; emergency relief.

Recovery - Returning the community to normal. Examples: temporary housing; grants; medical care.

There are three fundamental aspects of disaster management:

1. Disaster response
2. Disaster preparedness
3. Disaster mitigation

Disaster cycle-

Disaster Impact and Response Disaster Impact and Response- Medical treatment for large number of casualties is likely to be needed only after certain types of disaster. Most injuries are sustained during the impact, and thus, the greatest need for emergency care occurs in the first few hours. the management of mass causalities can be further divided into search and rescue, first aid, triage and stabilization of victims, hospital treatment and redistribution of patients to other hospitals if necessary.

Search, rescue and first - aid - After a major disaster, the need for search, rescue and first aid is likely to be so great that organized services will be able to meet only a small fraction of the demand. Most immediate help comes from the uninjured survivors.

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Field care- Most injured persons converge spontaneously to health facilities, using whatever transport is available, regardless of the facilities, operating status, providing proper care to casualties requires that the health service resources be redirected to this new priority. Bed availability and surgical services should be maximized. Provision should be made for food and shelter. a centre should be established to respond to injuries from patients relatives and friends. Priority should be given to victim's identification and adequate mortuary space should be provided.

Triage-When the quantity and severity of injuries overwhelm the operative capacity of health facilities; a different approach to medical treatment must be adopted. The principle of "first come, first treated", is not followed in mass emergencies. Triage consists of rapidly classifying the injured on the basis of the severity of their injuries and the like hood of their survival with prompt medical intervention. It must be adapted to locally available skills. Higher prognosis is granted to victims whose immediate or long term prognosis can be dramatically affected by simple intensive care. Triage is the only approach that can provide maximum benefits to the greatest number of injured a major disaster situation.

Tagging- All patients should be identified with tags stating their name, age, place of origin, triage category, diagnosis, and initial treatment.

Identification of dead- Taking care of the dead is an essential part of the disaster management. A large number of dead can also impede the efficient of the rescue activities at the site of the disaster. Care of the dead includes- removal of dead from the disaster scene, shifting to the mortuary, identification and reception of bereaved relatives. Proper respect for the dead is of great importance.

Epidemiologic Surveillance and Disease Control

Disaster can increase the transmission of communicable diseases through following mechanism:

1. Overcrowding and poor sanitation in temporary resettlements. This accounts in part, for the reported increase in acute respiratory infections.
2. Population displacement may lead to introduction of communicable diseases to which either the migrant or indigenous populations are susceptible.
3. Disruption and the contamination of water supply, damage to sewerage system and power systems are common in natural disasters.
4. Disruption of routine control programmes as funds and personnel are usually diverted to relief work.
5. Ecological changes may favour breeding of vectors and increases the vector population density.
6. Displacement of domestic and wild animals.
7. Provision of emergency food, water and shelter in disaster situation from different or new source may itself be source of infectious disease.

Vaccination- Health authorities are often under considerable public and political pressure to begin mass vaccination programmes, usually against typhoid, cholera and tetanus.

Nutrition- A natural disaster may affect the nutritional status of the population by affecting one or more components of food chain depending on the type, duration and extent of the disaster, as well as the food and nutritional conditions existing in the area before the catastrophe. Infants, children, pregnant, women, nursing mother and sick persons are more prone to national problems after prolonged drought or after certain types odd disasters.

Rehabilitations- The final phase in a disaster should be lead to restoration of the pre-disaster conditions. Rehabilitation starts from the very first moment of a disaster. Water supply, food safety, basic sanitation and personal hygiene, vector control etc., comes in rehabilitation.

Disaster mitigation in health sector- Emergency prevention and mitigation involve measures designed either to prevent hazard from

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causing emergency or to lessen the likely effects of emergencies. These measures include flood mitigation works, appropriate land-use planning, improved building codes, and reduction or protection of vulnerable population and structures.

Disaster preparedness- Emergency preparedness is "a programme of long-term development activities whose goals are to strengthen the overall capacity of a country to manage efficient all types of emergencies. It should bring about an orderly transition from relief through recovery, and back to sustained development". The objective of disaster preparedness is to ensure that appropriate systems, procedures and resources are in place to provide prompt effective assistance to disaster victims, thus facilitating relief measures and rehabilitation of services.

Disaster preparedness is an on-going multisectoral activity. It forms an integral part of the national system responsible for developing plans and programmes for disaster management, prevention, mitigation, preparedness, response, rehabilitation and reconstruction.

Indian Meteorological Department (IMD) plays a key role in for warning the disaster. It has five centres in Kolkata, Bhubaneshwar, Vishakhapatnam, Chennai and Mumbai for detection and tracing of cyclone storms. Satellite imagery facilities and cyclone warning radars are provided to various Cyclone Warning Centres.

In addition, it has 31 special observation posts set up along east coast of India. For all ships out at sea, warnings are issued six times a day. In sat Disaster Warning System (DWS) receivers have been installed primarily in the coastal areas of Tamil Nadu and Andhra Pradesh. This has proved very reliable form of communication system. The Snow and Avalanche Study Establishment (SASE) in Manali has been issuing warning to people about avalanches 24 to 48 hours in advance.

International Agencies Providing Health Humanitarian Assistance- United Nation's Agencies are United Nations Office for the Coordination of Humanitarian Affairs (OCHA), World Health Organization (WHO), UNICEF, World Food Programme (WFP), Food and Agriculture Organization (FAO). Intergovernmental organizations are European Community Humanitarian Office (ECHO), Organization of American States (OAS), Centre of Coordination for Prevention of Natural Disasters in Central America, Caribbean Disaster Emergency Response Agency. Some Non-Governmental Organizations are CARE, International Committee of Red Cross, International Council of Voluntary Agendes (ICVA), International Federation of Red Cross and Red Crescent Societies (IFRC) etc.

National Institute for Disaster Management (NIDM)

- Established: 1995 (under Indian institute of Public Administration)
- Ministry In-charge: Ministry of Home AffairsQ
- Head: Union Home Minister

Purpose:

1. To work as a think tank for Government by providing assistance in policy formulation
2. To facilitate in reducing the impact of disasters

National Disaster Response Force and Civil Defence (NDRF)

- Established: 2006
- Composition: 10 battalions from CRPF, BSF, ITBP, CISF

Purpose:

1. **Civil defence:** To safeguard the life and property of the civilian population and also to maintain the continuity of productive and economic activity of the nation during war time crisis
2. **Home guards:** To assist the police in controlling civil disturbance and communal riots (maintenance of internal security)
3. **Fire cell:** To organize Fire prevention and Fire fighting services, and to render technical advice on Fire Protection, Fire Prevention and Fire Legislation.

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MCQ On Disaster Management

1. In draughts, commonly noticed vitamin deficiency is:
   (a) Vitamin A (b) Vitamin B
   (c) Vitamin C (d) Vitamin D
2. Arrange the following phases of Disaster Cycle in a logical sequence
   (a) Disaster impact–Mitigation–Rehabilitation–Response
   (b) Disaster impact–Response–Rehabilitation–Mitigation
   (c) Rehabilitation–Response–Disaster impact–Mitigation
   (d) Response–Disaster impact–Rehabilitation–Mitigation
3. During a disaster, rapidly classifying the injured on the basis of likelihood of their survival with prompt medical intervention, is a part of:
   (a) Search, rescue and first aid
   (b) Triage
   (c) Tagging
   (d) Disaster mitigation
4. Most commonly reported disease in the post disaster period is:
   (a) Acute Respiratory Infections
   (b) Gastroenteritis
   (c) Tetanus
   (d) Malaria
5. As per the most common classification of Triage system that is internationally accepted, the colour code that indicates high priority treatment or transfer is:
   (a) Black (b) Yellow
   (c) Red (d) Blue
6. Which colour-coded person is given first preference in disaster triage?
   (a) Red (b) Black
   (c) Yellow (d) Green
7. Black colour in triage is:
   (a) Death (b) Transfer
   (c) High priority (d) Low priority
8. Triage has how many colours:
   (a) 2 (b) 3
   (c) 4 (d) 5
9. All vaccines are NOT given in disaster, except:
   (a) Cholera (b) Tetanus
   (c) Measles (d) Tetanus
10. Which of the following is the nodal centre for disaster management?
    (a) PHC (b) CHC
    (c) Police Control room (d) District
11. True about triage is:
    (a) Yellow-least priority
    (b) Red-morbidity
    (c) Green-ambulatory
    (d) Blue-ambulatory
12. Which is the calamity with most amount of damage?
    (a) Flood (b) Earthquake
    (c) Landslides (d) Volcanoes
13. Natural disaster causing maximum deaths:
    (a) Hydrological (b) Meterological
    (c) Geological (d) Fires
14. Triage is:
    (a) A concept in trauma
    (b) A method of breast lump diagnosis
    (c) An investigation for duodenum and pancreas
    (d) Management of old age health problems
15. Epidemics after disaster are caused by all except:
    (a) Leptospirosis
    (b) Rickettsiosis
    (c) Leishmaniasis
    (d) Acute respiratory infection
16. The gas responsible for Bhopal gas tragedy was:
    (a) Methyl isocyanate
    (b) Potassium isothiocyanate
    (c) Sodium isothiocyanate
    (d) Ethyl isothiocyanate

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17. Which epidemic does not occur after a disaster?
    (a) Leptospirosis (b) Leishmania
    (c) ARTI (d) Rickettsia
18. Nodal centre in case of disaster management:
    (a) PHC (b) Sub centre
    (c) CHC (d) District
19. During massive disaster what should be done first?
    (a) Search and rescue, first aid
    (b) Triage
    (c) Stabilization of victims
    (d) Hospital treatment and redistribution of patients to hospital if necessary
20. In a disaster management triage, patients who need surgery within 24 hours, are categorized under which colour category:
    (a) Red (b) Green
    (c) Blue (d) Black

MCQ Answers

1. Ans (a) Vitamin A
2. Ans. (b)Disaster impact–Response–Rehabilitation– Mitigation
3. Ans. (b) Triage
4. Ans. (b) Gastroenteritis
5. Ans. (c) Red
6. Ans. (a) Red
7. Ans. (a) Death
8. Ans. (c) 4
9. Ans. (c) Measles
10. Ans. (d) District
11. Ans. (c) Green-ambulatory
12. Ans. (a) Flood
13. Ans. (a) Hydrological
14. Ans. (a) A concept in trauma
15. Ans. (c) Leishmaniasis
16. Ans. (a) Methyl isocyanate
17. Ans. (b) Leishmania
18. Ans. (d) District
19. Ans. (a) Search and rescue, first aid
20. Ans. (c) Blue

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Chapter 14

Occupational Health

Syllabus

Definition of occupational health and Ergonomics. Occupational Hazards and Occupational diseases. Prevention and control of Occupational diseases. ESI Act ,1948 and The factories Act.1948. Role of Ayurveda in various Occupational health problems. The Merchant Shipping / Medical Examination Rules 2000.

Learning objectives

1. Define Occupational Health and Ergonomics.
2. Explain occupational Hazards.
3. Enlist occupational diseases and explain their prevention & control.
4. Explain ESI Act, 1948 and The factories Act,1948.
5. Describe the role of Ayurveda in various Occupational health problems.
6. Understand the Merchant Shipping / Medical Examination Rules, 2000

Total - 6 hours (Lecture :3 hour, Non-lecture: 3 hours)
MCQ- Yes- SAQ (5 Marks)- Yes- LAQ (10 Marks)- No

According to WHO occupational health should aim at the promotion and maintenance of highest degree of physical, mental and social wellbeing of workers in all occupations. The prevention among workers of departures from health, caused by their working conditions, the protection of workers in their employment risks resulting from factors adverse to health. The placing and maintenance of workers in an occupational environment adopted to his physiological and psychological equipment and to summarize the adoption of work to man and of each man to his job.

Bernardino Ramazzini (1633-1714) of Italy was the first person to stress the importance of taking occupational history of a patient. He wrote on occupational diseases. He is considered as "Father of Occupational Health".

Occupational Health And Ergonomics

Definition of Occupational Health- The common definition of the branch of medicine dealing with the prevention and treatment of job-related injuries and illnesses.

Modern concepts of occupational health now embrace all types of employment including mercantile and commercial enterprises, service trades, forestry and agriculture and includes the subjects of industrial hygiene, industrial diseases, industrial accidents, toxicology in relation to industrial hazards, industrial rehabilitation and occupational psychology. Occupational health in agriculture and ergonomics (human engineering) are relatively new concepts.

Definition of Ergonomics- the study of people's efficiency in their working environment.

It is a new concept in occupational health. It is concerned with human engineering. It is derived from Greek words, 'Ergon' means work and 'Nomos' means law. It simply means "fitting the job to the worker." That means placing the worker in an environment (job), which is adopted to his physiological and psychological capacity.

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The main object of ergonomics is to achieve the best mutual adjustment between the man and the machine, which are complimentary to each other, so that there is increased efficiency, increased production and decreased accidents in the industry.

This term was coined in a conference at Stockholm in 1961, conducted by International Ergonomics Association. Ergonomics has made a significant contribution in reducing the industrial accidents and in overall health and efficiency of the workers.

The health of the worker is influenced by 3 factors. Namely occupational (working) environment, domestic environment and social security and welfare measures.

Burden of Occupational Diseases- There are 100 million occupational injuries causing 0.1 million deaths in the world according to WHO. In India, it is estimated that 17 million (17% of global burden) occupational nonfatal injuries and 45,000 fatal injuries occur each year. Out of 11 million cases of occupational diseases in the world, 1.9 million cases (17%) are contributed by India and out of 0.7 million deaths in the world 0.12 million (17%) is contributed by India.

Aims :

1. To increase the efficiency
2. To increase the production
3. To decrease the accidents

Objectives :

1. To promote the health of the workers.
2. To maintain the highest degree of physical, mental and social well being of the workers.
3. To prevent the diseases by elimination of factors which are inimical to their health.

Occupational Environment Conditions- All the external conditions and influences, which is present at the work place and which influence the health of working personnel is occupational environment. Man interacts with physical, chemical and biological agent, machine and other men.

Man and Physical, Chemical, and Biological agents

Physical: The physical factors in the working environment which may be adverse to health are heat, cold, humidity, air, movement, heat radiation, light, vibrations, ionizing radiation etc. factors act in different ways singly and in different combination

Chemical: These include large number of chemicals, toxic dusts and gases which are hazardous to the health of workers.

Biological: Workers may come in contact to viral, rickettisal, bacterial and parasitic agents due to close contact with animals or their products, contaminated water, soil and food.

Man and Machine- The interaction between man and machine. In almost all the industries, the machines are driven by power. Poor installation of machines, the unguarded machines, protruding and moving parts, poor maintenance etc. result in accidents. Working for long hours result in fatigue, discomfort and diseased efficiency.

Man and Man - The interaction between the worker and his co-workers and the employer. This depends upon many psychosocial factors at work place like nature of the work, colleagues, communications, higher authority, system of payments, welfare conditions, work stability, degree of responsibility, service condition, job satisfaction, incentives etc.

Occupational Hazards

An industrial worker is exposed to the following five types of hazards (Physical, chemical, biological, mechanical and psychosocial hazards), depending upon the nature of the occupation.

Physical Hazards

- **Heat:** The effects are heat syncope, heat cramps, heat exhaustion, heat stroke, heat hyperpyrexia, prickly heat, burns etc.
- **Cold:** Frost bite, Reynaud's disease, erythromelalgia, erythrocyanosis, chilblains, trench-foot, gangrene etc.
- **Heat syncope-** It is fainting attack due to pooling of blood in lower limbs.
- **Heat cramps-** It is painful and spasmodic

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contractions of muscles due to loss of sodium and chloride.

- **Heat exhaustion-** It means loss of salt leading on to circulatory failure.
- **Heat hyperpyrexia-** It is characterized by failure in heat regulating mechanism without the features of heat stroke. Temperature is about 106 åF. It may proceed to heat stroke.
- **Heat stroke-** There will be failure in the heat regulating mechanism, resulting in high temperature of the body, delirium, convulsions, partial or total loss of consciousness.
- **Frost bite-** Erythema and slight pain are features. In severe case painless, paraesthetic parts, result in deep seated destruction, gangrene and blistering may occur.
- **Erythrocyanosis-** Limbs are swollen and red due to direct exposure to cold.
- **Chilblains-** Erythema, itching, burning especially of dorsa of fingers, toes, heels, nose, ears on exposure to extreme cold. Lesions can be single or multiple and can become blistered and ulcerated.
- **Light-** Effects occur either due to inadequate light or excessive light.
- **Inadequate light-** Headache, eye strain, eye fatigue, eye pain.
- **Excessive light-** Bright light results in glaring, visual fatigue, blurring of vision, discomfort and accidents.
- **Noise-** Noise is a health hazard in many industries. The effects of noise are of two types. **NoiseAuditory effects-** Deafness (temporary or permanent), tinnitus (buzzing in the ears). **Non-Auditory effects-** Fatigue, irritability, nervousness, interference with speech and communication, hypertension, peptic ulcer, higher environmental stress.
- **VibrationVibration-** Frequency range 10-500Hz, when working with tools like drill, hammers etc. vibration generally affects hands and arms. After months and years of exposure, fine blood vessels of fingers may become increasingly sensitive to spasm, injuries to joints of fingers, hands, elbows and shoulders may occur.

Exposure to Ultra-violet radiationExposure to Ultra-violet radiation- On the skin- Darkening of the skin, thickening of the skin, erythema, cancer of the skin. On the eyes (E.g.-Welding)- Photophobia, conjunctivitis, keratitis, corneal ulcer, blindness (Welder's fish), snow blindness.

Exposure to Ionizing radiationExposure to Ionizing radiation- X-rays, radio-active isotopes like cobalt 60, phosphorus 32 produce genetic changes, malformations, cancer, leukemia, ulceration, sterility and death in extreme cases.

Chemical Hazards

Chemical agents act in 3 ways: Local, Inhalation and Ingestion. The ill effects depend on duration of exposure, amount and individual susceptibility.

1. **Local effects:** Dermatitis, eczema, ulcer and even cancer.
   a. Dermatitis due to allergy- machine oils, rubber, X-ray, Caustic alkalies, lime etc.
   b. Aromatic nitro and amino-compounds such as TNT and aniline are absorbed through skin and cause systemic effects.
2. **Inhalation:** Dusts, fumes, gases and metals and their compound.
   - **Dusts-** Dusts are finely divided solid particles with size ranging from 0.1 to 150 microns. They are released into the atmosphere during crushing, grinding, abrading, loading and unloading operations. Dusts are produced in a number of industries mines, foundry, quarry, pottery, textile, wood or stone working industries, Example- Pneumoconiosis.
   - **Fumes-** Metal fume fever (This chemical intoxication results from inhalation of fumes of molten metals like arsenic, antimony, beryllium, cadmium, cobalt, lead, zinc, mercury etc.)
   - **Gases-** Exposure to gases is a common hazard in industries.

   a. Simple gases- O2, H2

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b. Asphyxiating gases- CO, SO_2, Cl_2, H_2S, methyl isocyanides gas etc.
c. Anaesthetic gases- Chloroform, ether, trichloroethylene

Ingestion: Toxic hazards occurring from the metals like lead, arsenic, mercury, cadmium, manganese, chromium etc.

Biological Hazards

Workers may be exposed to infective and parasitic agents at the place of work. These are from the animals and soil. These are common in agricultural industry.

- From the animals- they are called 'Zoonotic diseases'. Ex: Anthrax, rabies, plague, salmonellosis, bovine tuberculosis.
- From the soil- Tetanus, gag-gangrene, malignant oedema, anthrax, mycetoma.

Mechanical Hazards- 10% of accidents in the industry are due to mechanical causes.

Psychological Hazards- These are due to failure of the worker to develop a healthy relationship with his co-workers, employers, management, supervisors etc. They are divided into two groups.

1. Psychological and behavioural changes: Such as hostility, aggressiveness, anxiety, depression, frustration, tardiness, alcoholism, drug addiction, sickness absenteeism etc.
2. Psychosomatic ill health: Such as neurosis, fatigue, propensity to peptic ulcer, hypertension, asthma etc.

Occupational Diseases and their Prevention and Control

1. Diseases due to physical agents

a) Heat- Heat hyperpyrexia, heat exhaustion, heat syncope, heat cramps, burns and local effects such as prickly heat.
b) Cold- Trench foot, frost bite, chilblains.
c) Light- Occupational cataract, miner's nystagmus.
d) Pressure- Caisson disease, air embolism, blast (explosion).
e) Noise- Occupational deafness.
f) Radiation- Cancer, leukemia, aplasticanemia, pancytopenia.
g) Mechanical factors- Injuries, accidents.
h) Electricity- Burns.

2. Diseases due to chemical agents

a) Gases- CO_2, CO, HCN, CS_2, NH_3, N_2, H_2S, HCl, SO_2 these cause gas poisoning.
b) Dusts (Pneumoconiosis)

I. Inorganic dusts

- Coal dust- Anthracosis
- Silica- Silicosis
- Asbestos- Asbestosis, cancer lung
- Iron- Siderosis

II. Organic (Vegetable) dusts

- Cane fiber- Bagassosis
- Cotton dust- Byssinosis
- Tobacco- Tobacossis
- Hay or grain dust- Farmer's lung

III. Metals and their compounds- Toxic hazards from lead, mercury, cadmium, manganese, beryllium, arsenic, chromium etc.

IV. Chemicals- Acids, alkalis, pesticides

V. Solvents- Carbon bisulphide, benzene, trichloroethylene, chloroform etc.

3. Diseases due to biological agents- Brucellosis, leptospirosis, anthrax, actinomycosis, hydatidosis, psittacosis, tetanus, encephalitis, fungal infections etc.

4. Occupational cancers- Cancer of skin, lungs, bladder.

5. Occupational dermatitis- Dermatitis, eczema.

6. Diseases of psychological origin- Industrial neurosis, hypertension, peptic ulcer etc.

Occupational Dermatitis

Occupational dermatitis is a big health problem in many industries. The causes may be :

1. Physical- Heat, cold, moisture, friction, pressure, X-rays and other rays.
2. Chemical- acids, alkalies, dyes, solvents, grease, tar, pitch, chlorinated phenols.

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3. Biological- living agents, such as viruses, bacteria, fungi, and other parasites.
4. Plant products- Leaves, vegetables, fruits, flower, vegetables, dust.

Dermatitis producing agents are further classified into :

1. Primary irritants- Primary irritants (e.g. Acids, alkalies, dyes, solvents) cause dermatitis in workers exposed in sufficient concentration acid for a long enough period of time.

2. Sensitizing substance- On the other hand, allergic dermatitis occurs only in small percentage of cases due to sensitization of the skin.

Prevention: Occupational dermatitis is largely preventable if proper control measures are adopted.

Pre-selection- The workers should be medically examined before employment, and those with an established (or) suspected dermatitis.

Protection- The worker should be given adequate protection against direct contact by protective clothing, long leather gloves, aprons, and boots. The protective clothing should be frequently washed and kept in good order.

Personal Hygiene- There should be available a plentiful supply of warm water, soap and towels the worker should be encouraged and educated to make frequent use of these facilities.

Pneumoconiosis

Dust within the size range of 0.5 to 3 micron, is a health hazard producing, after a variable period of exposure, a lung disease known as pneumoconiosis, which may gradually cripple a man by reducing his working capacity due to lung fibrosis and other complications. The hazardous effects of dusts on the lungs depend upon a number of factors such as (a) chemical composition (b) fineness (c) concentration of dust in the air (d) period of exposure and (e) health status of the person exposed.

Silicosis

Silicosis, also known as Potter's rot is a form of occupational lung disease caused by inhalation of crystalline silica dust and is marked by inflammation and scarling in forms of nodular lesions in the upper lobes of the lungs. It is a type of pneumoconiosis, from pneumo (lung) and konis (dust).

Causes: Because of the wide presence of crystalline silica in nature in an undisturbed form, as in rocks and the earth's crust, people in occupations that disturb the natural state or those involved in collecting or refining the material are at risk of developing silicosis.

These occupations include the following: mining, querying, drilling, crushing stones, chipping, grinding, sand blasting, grinding or polishing, in pottery and foundry work, cement manufacturing, glass manufacturing, masonry, blast furnaces, coal mining, construction, cutting or manufacturing heat resistant bricks, dental laboratory technicians.

Signs and Symptoms

1. Dyspnoea exacerbated by exertion
2. Cough, often persistent and sometime severe
3. Fatigue
4. Tachypnea
5. Loss of appetite and weight loss
6. Chest
7. Fever
8. Gradual dark shallow rifts in nails eventually leading to crack as protein fibre within nails beds are destroyed.

In advance cases :

1. Cyanosis
2. Corpulmonale
3. Respiratory insufficiency.

Diagnosis

1. History collection
2. Physical examination
3. Chest X-ray reveals findings consistent with silicosis
4. Pulmonary function testing: may reveal airflow limitation, restrictive defects, reduced diffusion capacity, mixed defects or may be normal (in uncomplicated)

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Treatment : Silicosis is an irreversible condition with no cure. Treatment options currently focus on alleviating the symptoms and preventing complications. These include:

1. Stopping further exposure to silica and other lung irritants, including tobacco.
2. Cough suppressants.
3. Antibiotics for bacterial lung infection.
4. TB prophylaxis for those with positive tuberculosis skin test.
5. Chest physiotherapy to help the bronchial drainage of mucus.
6. Oxygen administration to treat hypoxemia, if present Bronchodilators to facilitate breathing.
7. Lung
8. Transplantation.

Prevention and control:

- Rigorous dust control measures like wearing mask improving the ventilation of work place.
- Water spray is often used where dust emanates
- Dust can also be controlled by dry air filtering.

Anthracosis (Coal Workers Pneumonconiosis)

Black lung disease, also known as Coal worker's pneumoconiosis, is caused by long exposure to coal dust. It is a condition characterized by the accumulation of carbon in lungs.

Causes: Inhalation of coal dust.

Risk Factors: Smoking

Signs & Symptoms: No early symptoms, Cough, Chest pain, Breathing difficulty, Dyspnoea, Bronchitis, Cyanosis, Progressive lung stiffening, Shortness of breath, Impaired lung functions

Diagnosis :

1. History collection
2. Physical examination
3. Chest X-ray
4. Pulmonary function tests
5. Chest CT Scan
6. HRCT – High resolution CT Scan

Treatment: There is no cure for the black lung disease. Treatments are aimed at the symptoms and complicated.

Prevention and control:

1. Dust control measures like wearing face mask
2. Improving the ventilation of the factory
3. Improving the machinery to reduce the dust
4. Wetting procedures should be carried out so that the dust will not concentrated in air.

Measures of Health Protection in Industrial units

1. Proper Nutrition
2. Communicable disease control
3. Environment sanitation
4. Mental health promotion
5. Health education
6. Protective measures foe women and children
7. Family planning

Byssinosis

Byssinosis is a disease of the lungs brought on by breathing in cotton, dust or dusts from other vegetable fibres such as flax, hemp or jute while at work.

Incidence: In United States, more than 35000 textile workers have been disabled by Byssinosis and 183 died between 1979 and 1992. In India, among 35% of textile industry 7 to 8% of workers are affected with Byssinosis.

Causes :

- The most common cause is breathing in the dust produced by raw cotton.
- People who work in the textile industry
- Smoking increases the risk for this disease.

Signs and Symptoms :

- Chest tightness
- Progressive Dyspnoea
- Chronic Cough
- Tachypnea
- Wheezing
- Symptoms will get worse at the beginning of the work week and then improve while you

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are away from the work place, or late in the work week.

Diagnosis :

1. History collection: Occupation and will ask many questions to try to find out whether your symptoms relate to certain exposure or times of exposure.
2. Physical examination
3. Chest X-ray
4. Pulmonary function tests- Shows typical airflow obstruction and a reduction investigatory capacity, especially if measured at the start and end of the first work shift.

Treatment :

1. The most important treatment is to remove the source of exposure to the offending agent.
2. Medications such as bronchodilators will usually improve symptoms.
3. Corticosteroids may be prescribed in more severe cases.
4. Stopping smoking is very important for people with this condition.
5. Respiratory treatments including Nebulizers and postural drainage for chronic Conditions.
6. Home oxygen therapy if low blood oxygen levels are detected.
7. Physical exercise programs, breathing exercises and patient education programs are often very helpful for people with a chronic lung disease.

Complications : Chronic lung disease and Emphysema.

Prevention and control:

1. Controlling dust to prevent the occurrence of disease.
2. Using face masks prevent the dust entering the airway.
3. Improving ventilation of the factory so that the dust is reduced.
4. Reduction of dust levels by improving machinery.
5. Stop smoking if you are a textile industry worker.
6. Wetting procedures so that the dust will not concentrated in the air.

Bagassosis

Bagassosis is the name given to an occupational disease of the lung caused by inhalation of bagasse or sugarcane dust. It was first reported in India by Ganguli and Pal in 1955 in a cardboard manufacturing firm near Kolkata. India has a large cane-sugar industry.

Symptoms - Breathlessness, cough, haemoptysis and slight fever. Initially there is acute diffuse bronchiolitis.

Diagnosis- Skiagram may show mottling in lungs or shadow. There is impairment of pulmonary function.

If treated early, there is resolution of the acute inflammatory condition of the lung. If left untreated, there is diffuse fibrosis, emphysema and bronchiectasis.

Prevention and control-

1. **Dust control** - Measures for the prevention and suppression of dust such as wet process, enclosed apparatus, exhaust ventilation etc., should be used.
2. **Personal Protection-** Personal protective equipment (masks or respirators with mechanical filters or with oxygen or air supply) may be necessary.
3. **Medical Control-** Initial medical examination and periodical medical check-ups of the workers are indicated.
4. **Bagasse Control-** By keeping the moisture content above 20 per cent and spraying the bagasse with 2 per cent propionic acid, a widely used fungicide, bagasse can be rendered safe for manufacturing use.

Asbestosis

Asbestosis is a chronic inflammatory and fibrotic medical condition affecting the parenchymal tissue of the lungs caused by the inhalation and retention of asbestos fibres.

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Causes:

1. Exposure to asbestos fibers
2. Occupation like mining, manufacturing, handling or removal of asbestos are at risk of developing asbestosis.
3. Smoking increases the risk of developing asbestosis.

Signs and symptoms:

1. Dyspnoea especially on exertion
2. Chest pain
3. Cough, crackles present

Possible additional symptoms include :

1. Nail abnormalities
2. Clubbing of fingers

Diagnosis:

1. History collection about the occupation and will ask many questions to try to find out whether you relate to occupation
2. Physical examination
3. Chest X - ray shows lung changes
4. CT scan of the lungs shows the specific areas affected
5. Gallium lung scan shows the specific areas affected
6. Pulmonary function tests show typical airway obstruction and a reduction in ventilator capacity.

Treatment:

1. There is no cure available
2. Stopping further exposure to asbestos is essential
3. To ease symptoms, postural drainage, chest percussion and vibration can help remove secretion from the lungs.
4. Nebulizers to thin secretions
5. Oxygen therapy by mask or by a plastic piece that fit the nostrils
6. Lung transplantation

Complications: Malignant mesothelioma AND Pleural effusion

Prevention and control:

1. In people who are exposed to asbestos, early screening by chest X-ray
2. Dust control measures like wearing mask, wetting procedures, ventilation should be improved in the work place
3. Frequent rest periods
4. Usage of sophisticated machines.

Farmer's Lung

Farmer's lung is due to the inhalation of mouldy hay or grain dust in the agricultural field. In grain dust or hay with a moisture content of over 30 percent, bacteria and fungi grow rapidly, causing a rise of temperature to 40 to 50 deg.C. This heat encourages the growth of thermophilic actinomycetes, of which Micropolyspora faeni is the main cause of farmer's lung.

Symptoms- The acute illness is characterized by general and respiratory symptoms and physical signs. Repeated attacks cause pulmonary fibrosis and inevitable pulmonary damage and cor pulmonale. It is quite possible that this condition might be widespread in India considering the bulk of the population engaged in agricultural work.

Diagnosis- X-ray chest shows 'fine nodular density'

Prevention and control-

1. Dust control measures like wearing mask, cover the mouth and nose by cloth.
2. Frequent rest periods.

List of Pnemoconiosis

Disease	Exposure source
Silicosis	Silica dust
Anthracosis	Coal dust
Asbestosis	Asbestos dust
Byssinosis	Cotton fibre
Bagassosis	Molasses (sugarcane)
Berylliosis	Beryllium
Farmer's Lung	Mouldy hay
Siderosis	Iron dust
Stannosis	Tin dust
Bird fancier's lung	Avian/ bird droppings
Compost lung	Compost

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Lead Poisoning

More industrial workers are exposed to lead than to any other toxic metal.

Mode of Absorption - Lead poisoning may occur in three ways:

1. Inhalation- Most cases of industrial lead poisoning is due to inhalation of fumes and dust of lead or its compounds.
2. Ingestion- Poisoning by ingestion is of less common occurrence. Small quantities of lead trapped in the upper respiratory tract may be ingested. Lead may also be ingested in food or drink through contaminated hands.
3. Skin- Absorption through skin occurs only in respect of the organic compounds of lead, especially tetraethyl lead. Inorganic compounds are not absorbed through the skin.

Clinical Picture- The clinical picture of lead poisoning or plumbism is different in the inorganic and organic lead exposures. The toxic effects of inorganic lead exposure are abdominal colic, obstinate constipation, loss of appetite, blue-line on the gums, stippling of red cells, anaemia, wrist drop and foot drop. The toxic effects of organic lead compounds are mostly on the central nervous system insomnia, headache, mental confusion, delirium, etc.

Diagnosis- History, clinical features, laboratory test (corroprphyrin in urine test, Amino levulinic acid in urine, lead in blood and urine, basophilic stipling of RBC test).

Prevention and control-

1. Substitution - Where possible lead compounds should be substituted by less toxic materials.
2. Isolation- All processes which give rise to harmful concentration of lead dust or fumes should be enclosed and segregated.
3. Local exhaust ventilation- There should be adequate local exhaust ventilation system to remove fumes and dust promptly.
4. Personal protection - Workers should be protected by approved respirators.
5. Good house-keeping- Essential where lead dust is present. Floors, benches, machines should be kept clean by wet sweeping.
6. Working atmosphere- Lead concentration in the working atmosphere should be kept below 2.0 mg per 10 cu. metres of air, which is usually the permissible limit or threshold value.
7. Periodic examination of workers- All workers must be given periodical medical examination. Laboratory determination of urinary lead, blood lead, red cell count, haemoglobin estimation and coproporphyrin test of urine should be done periodically.
8. Personal hygiene- Hand washing before eating is an important measure of personal hygiene.
9. Health Education- Workers should be educated on the risks involved and personal protection measures.

Occupational Cancer

Occupational cancer is a serious problem in Industry. The sites of the body most commonly affected are skin, lungs, bladder, and blood-forming organs.

Skin cancer- Percival Pott was first to draw attention to cancer of scrotum in chimney sweeps in 1775. It was subsequently found that cancer of the scrotum and of the skin in other parts of the body was caused by coal tar, X-rays, certain oils and dyes. Statistics now show that nearly 75 per cent of occupational cancers are skin cancer. Skin cancers are an occupational hazard among gas workers, coke oven workers, tar distillers, oil refiners, dye-stuff makers, road makers and in industries associated with the use of mineral oil, pitch, tar and related compounds.

Lung cancer- Lung cancer is a hazard in gas industry, asbestos industry, nickel and chromium work, arsenic roasting plants and in the mining of radio-active substances (e.g., uranium).

Nickel, chromates, asbestos, coal tar (presumably 3-4 benzpyrene), radio-active substances and cigarette-smoking are proved carcinogens for the lungs. Arsenic, beryllium and isopropyl oil are suspected carcinogens. More than

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nineteenths of lung cancer are attributed to tobacco smoking, air pollution and occupational exposure.

Cancer bladder- It was first noted in man in aniline industry in 1895. In more recent years, it was noted in the rubber industry. It is now known that cancer bladder is caused by aromatic amines, which are metabolized in the body and excreted in the urine. The industries associated with cancer bladder are the dye-stuffs and dyeing industry, rubber, gas and the electric cable industries.

Leukaemia- Exposure to benzol, roentgen rays and radio-active substances give rise to leukaemia. Benzol is a dangerous chemical and is used as a solvent in many industries. Leukaemia may appear long after exposure has ceased.

Personal hygiene is very important in the prevention of occupational cancer.

Prevention of occupational hazards

It can be prevented by 3 levels: Medical, Engineering and legislation

1. Medical level

a. Prior placement examination
b. Periodical check ups or examination
c. Medical and health-care facilities
d. Notification and record maintenance
e. Supervision of work environment and protective measures
f. Health education and counselling

2. Engineering level

a. Design of building
b. Hygienic measures or good house keeping
c. General ventilation, exhaust ventilation
d. Mechanization to prevent contact with harmful chemicals
e. Substitution for manufacture of less harmful substance
f. Dust control by water spraying, hydro-blasting etc
g. Enclosure by shielding with protective coverage's
h. Isolation of some risky operations
i. Protective devises like masks, shields, aprons etc to prevent damage
j. Environment monitoring, toxic substances should be below maximum permissible limits
k. Research- Longitudinal studies should be conducted about the health of the workers.

3. Legislation and Acts

Society has an obligation to protect the health of the worker engaged in diverse occupations. It has grown out of the realisation that the worker is more important than the machine which he operates. The worker cannot be permitted to endanger his life and limb in an occupation, while the employer makes a fortune. Factory laws, therefore, have been framed in every country to govern the conditions in industry and to safeguard the health and welfare of the worker.

Factories Act, 1948 and Employees State Insurance Act, 1948

Factories act 1948Factories act 1948- It dates back to 1881 with latest amendment 1987

1. Scope-

a. 10 or more workers are working in a place where power is used is called as factory
b. 20 or more workers are working in a place where no power is used called as factory. There is no difference between perennial factory and seasonal factory

2. Health, safety and welfare-

a. Here cleanliness, lighting, ventilation are considered
b. Safety officer is appointed for every 1000 or more worker
c. Canteen should be present where 250 workers are working

3. Children below 14 years are prohibited- Adolescents: 15-18 years can work after surgeon certifies and he cannot do dangerous works

4. Work hours-

- Man-48hrs/week
- Man-9hrs/day

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- Rest of 1/2 hrs after 5hrs work
- Adolescent- 41/2 -5 hr/day

5. Leave with wages-

- Adult- 1 day for 20 days of work, 30days (maximum)
- Children- 1 day for 15days of work, 40days (maximum)

6. Occupational disease should be notified

7. Employment hazard should be considered

The Employees State Insurance Act 1948

ESI Act was passed in 1949 and amended in 1975, 1984 and 1989. This is an important measure of social security and health insurance in India. The Act provides benefits in Cash and Kind, to the industrial workers, in case of sickness, maternity and employment injury, thereby removing the economic fear and physical fear.

Scope- The ESI Act extends to whole of India. It applies to all factories (establishments) employing less than 20 members and power is being used or more than 20 members and power is not used. The amendment made in 1975, includes the following establishments also Hotels and restaurants, Cinemas and theatres, Road transport establishments. Newspaper establishments and Shops.

The administration of ESI Scheme under the Act is entrusted to an autonomous body, called 'ESI Corporation', which meets at least twice a year. The body consists of the following members

1. Chairman: The Union Minister of Labor.
2. Vice-chairman: Secretary to Government of India Ministry of Labor.
3. Five representatives of Central Government.
4. One representative from each State Government.
5. One representative for all Union Territories.
6. Five representatives of employees.
7. Five representatives of employers.
8. Two representatives from medical profession.
9. Three members of parliament.

Finance

The different sources of finance to run the scheme are:

1. Contribution by the employees—1.75 percent of their wages
2. Contribution by the employers—4.75 percent the wages of their workers
3. State Government—contributes 1/8 total cost of medical care
4. ESI-Corporation—contributes 7/8 of total cost of medical care
5. Government of India—contributes 2/3 of administrative expenditure. (Employees getting daily wages of below ' 15/- are exempted from payment of contribution).

Benefits to Employees-

1. Sickness benefit
2. Maternity benefit
3. Disablement benefit
4. Dependent benefit
5. Funeral benefit
6. Medical benefit
7. Rehabilitation benefit.

All these benefits are provided to only those employees whose wages do not exceed ' 7500/- per month.

Common Services-

1. It includes facilities like OPD services, drug supply, immunization etc. with the help of Direct and Indirect pattern services
2. Sickness benefit in the form of cash payment for 91 days or even more in sickness condition like TB, leprosy, AIDS etc.
3. Maternity benefit in the form of cash in case of pregnancy and abortion is provided
4. In case of injury or disability payment is given periodically
5. In case of death funeral expenses are borne by the agency
6. On payment of Rs 10/month the member and his family get free treatment, even after retirement or disability.

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Role of Ayurveda in Various Occupational Health Problems

Every occupation has its own challenges but it is not possible for everyone to quit the occupation. Therefore, one should do his or her occupation following preventive measures for minimizing the challenges. In ancient times, there were different occupations and occupational disorders were also different. But in present time, due

to development of technology many occupational disorders have been emerged causing different occupational disorders. Nowadays, farmers, businessmen, defence personnels,

labours, etc. have their own occupational disorders. Preventive management is always better than curative management. Ayurveda also emphasizes on preventive management. Therefore, it is better to prevent occupational disorders than to treat them. There are many preventive measures for different occupational disorders. Person who does excess physical work should take rest properly and take proper diet. Person who does excess mental work should do physical exercise daily. Yoga is beneficial for both physical and mental working persons.

Dust is the main problem in many industries. Advance technology should be used producing less dust and employees should be given high quality of mask to prevent dust. Temperature of working place should be maintained by using technology in very hot and cold areas. Rules of Dinacharya, Ritucharya, Adharniya and Dharniya Vega, Ahara vihara, etc. should be followed to prevent the diseases.

Some of the occupational disorders and management by Ayurveda

Prameha (DM) - cause sedentary lifestyle- Katu, Tikta, Kashaya Rasa and walking.

Padadari (cracks in foot)- Cause excessive walking- Abhyanga, Swedana, Lepana with medicated oil or ghee.

Sthaulya (obesity) – lack of physical work- Shilajita, Guggulu, Gomutra, Triphala etc and regular exercise and Lakhaniya Basti

Arsha (piles)- regular sitting on hard surface- Takrashitha, Abhyarishta, Ghee, fibre rich food.

Anidra (insomnia)- excessive workload- Pranayama, Shirodhara, Ashwagandha like medicine.

Shushka Akshi (dry eye syndrome)- working too much on the computer- Tarpana, Eye exercise, Rasayana, Chakshushya medicine.

Shwasa Roga (asthma)- dust and other gases- Nasya Karma, Rasayana Dravya, Haridra Kandha, Haritaki Kandha etc.

Karshya (emaciation)- Ashwagandha, Vidarikanda, Satavari and Bruhmaniya Dravya.

The Merchant Shipping / Medical Examination Rules 2000

The Merchant Shipping (Medical Examination) Rules, 2000 Published vide Notification No. G.S.R. 57(E), dated 19th January, 2000 Act 2686, Ministry of Surface Transport (Department of Shipping).

Approval of Medical Examiner.- An official of the Directorate General of Shipping duly authorised by the Director General shall approve such numbers of Medical Examiners at such ports or places, as deemed necessary for the purpose of sub-section (2) of section 98 of the Act.

Medical examination- Every seafarer, for the purposes of sections 98(2) and 111 of the Act, shall be subject to the following medical examinations, as may be applicable, namely:-

(a) **Pre-sea medical examination**- This medical examination is conducted before a person embarks upon a seafaring career and includes Pre-sea Eye Test as per the standards of physical fitness specified in Annexure-I and standards of Eye Sight standards specified in Annexure-II.

(b) **Periodic medical examinations**- This medical examination is conducted at periodic intervals during the seafarer's career as per the standards

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specified in Annexure-I and Annexure-III.

(c) **Periodic Eye Test-** This Eye Test is conducted on seafarers appearing for Nautical Grade Examinations for issue of Certificate of Competency as per the standards specified in Annexure-III]

Arrangements for medical examination-

1. The director or officer selects applicants for pre-sea training and registers their details, including full name, age, category, Continuous Discharge Certificate, and passport number. They schedule the examination and inform the medical examiner and applicant.
2. The ship owner or agent must provide details of a seaman, including full name, age, certificate number, passport number, and identification, to a medical examiner and schedule a medical examination in accordance with these rules.

Appearance for medical examination- Master or seaman must present registration book and continuous discharge certificate at medical examiner's appointed time and place for examination and subsequent dates.

Conduct of medical examination–

1. Individuals attending medical examinations must report to examiners and undergo minimum tests to determine fitness according to Annexure-I, II, and III standards.
2. Seafarers may need vaccinations, if applicable.
3. Shipping company covers medical examinations, vaccinations for employment purposes.

Records of medical examination-

1. Medical Examiner records examinations and physical fitness certificates for specified periods.
2. Electronic records must be maintained.
3. Records accessible for inspection and verification by surveyors and Directorate General.

Certificate of physical fitness.

1. Medical certificate issued for physical fitness-satisfied individuals after 5th examination.
   (a) in case of pre-sea medical examination, as specified in Annexure – IV and Annexure V;
   (b) in case of periodic medical examination, as specified in Annexure – IV; and,
   (c) in case of periodic Eye test, as specified in Annexure-V.
2. Medical examiner issues certificate indicating temporary or permanent unfitness if a person fails physical fitness standards.

Records of results- Director of pre-sea training institute must record medical examination results for referred seaman.

Validity of certificate of physical Fitness.-

1. Medical certificate validity for seafarers is two years unless specified, except for those under 18 years old, where it is one year.
2. If a medical certificate expires during voyage, it remains valid for three months or until an approved Medical Examiner is available, allowing seafarers to obtain a renewed certificate.

Appointment of the Appellate Authority

1. Central Government can form Appellate Authority with three Medical Science specialists.
2. The Central Government will draw the panel of specialists for the appellate authority, involving representatives of shipowners and seafarers, without empanelled individuals.

Appeal against the decision of the medical examiner- A person undergoing medical examination may appeal against medical examiner decisions within 60 days, provided they have sufficient cause for not making the appeal. The appeal must be accompanied by a copy of the contested order. The Director of Seamen's Employment Office must refer the appeal to the Appellate Authority and inform the seaman of the examination date and time. The appellate authority must give a reasonable opportunity to be heard before disposing of the appeal. The decision is binding on the seaman and ship owner/agent. A seaman with active service on ships for five years

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can apply for review within one year of being declared permanently unfit for review if they have obtained a certificate of fitness from a medical specialist.

Suspension or cancellation of approval as Medical Examiner- Rule 4 allows Medical Examiner approval to be suspended or cancelled for serious lapse, misconduct, unethical conduct, or non-professional conduct. A cautionary note may be issued in cases of procedural lapse. No order can be passed without a reasonable opportunity for hearing. Medical Examiners can appeal suspension or cancellation decisions within 15 days. The Director General's decision is final and binding.

Repeal and savings- Indian Merchant Shipping Medical Examination Rules 1986 repealed, ensuring medical reports and certificates are valid under corresponding provisions.

For Annexure-I, Annexure-II, Annexure-III, Annexure-IV refer the website Directorate General of shipping – Acts and Rules

https://dgshipping.gov.in/Content/PageUrl.aspx?page_name=MedicalExaminationRules2000

MCQ On Occupational Health

1. Following occupational diseases are notifiable under the Indian Factory Act, 1976 except:
   (a) Silicosis (b) Asbestosis
   (c) Byssinosis (d) Bagassosis
2. Ideal periodical examination of worker in an industry is done every:
   (a) Day (b) Month
   (c) Year
   (d) Depends on type of exposure
3. Indian constitution has declared that children less than _____ years should not be employed in factories or mines:
   (a) 10 (b) 12
   (c) 14 (d) 16
4. 'Safety officers' have to be appointed in factories where no. of workers is more than:
   (a) 500 (b) 1000
   (c) 2000 (d) 5000
5. Useful screening test for lead is measurement of:
   (a) Coproprophyrin in urine
   (b) Amino-laevulinic acid in urine
   (c) Lead in blood
   (d) Lead in urine
6. Lead poisoning in industries commonly occurs by:
   (a) Inhalation (b) Ingestion
   (c) Skin absorption (d) Conjunctival route
7. Inhalation of sugarcane dust could cause:
   (a) Bagassosis (b) Byssinosis
   (c) Tobacosis (d) Farmer's lung
8. All are features of Silico-tuberculosis except:
   (a) High sputum AFB +ve
   (b) Children of such cases do not get disease
   (c) Impairement of total lung
   (d) Nodular fibrosis
9. All are disease manifestations associated with Low Temperature except:
   (a) Chilblains (b) Prickles
   (c) Frostbite (d) Trench foot
10. Periodic Examination of factory workers is a type of:
    (a) Primordial Prevention
    (b) Primary Prevention
    (c) Secondary Prevention
    (d) Tertiary Prevention
1. With reference to lead poisoning, various parameters are given below with the levels:
   A. Coproporphyrin in urine
   B. Aminolevulinic Acid in urine
   C. Lead in urine
   D. Lead in blood
   I. > 70 mg/100 ml II. > 5 mg/L
   III. >150 mg/L IV. > 0.8 mg/L
   Correct match is:
   (a) A-I B-II C-IV D-III
   (b) A-III B-IV C-II D-I
   (c) A-I B-IV C-II D-III
   (d) A-III B-II C-IV D-I

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12. "White Fingers" may result from which of the following occupational hazards:
(a) Heat (b) Cold
(c) UV Radiation (d) Vibration

13. Respirable dust, responsible for pneumoconiosis, has a size limit of:
(a) < 1 micron (b) < 5 micron
(c) < 10 micron (d) < 100 micron

14. Which of the following Pneumoconioses is caused by Thermoactinomyces Sacchari?
(a) Silicosis (b) Anthracosis
(c) Byssinosis (d) Bagassosis

15. Which of the following Pneumoconioses is caused by Micropolyspora Faeni?
(a) Silicosis (b) Byssinosis
(c) Farmer's lung (d) Bagassosis

16. Which of the following are associated with Bladder Cancer:
(a) Nickel (b) Naphthylamines
(c) Arsenic (d) Lead

17. Pre-placement examination has an important role to play in:
(a) Energy Conservation
(b) Occupational Health
(c) Genetic Counselling
(d) Mental Health

18. Under ESI Act, sickness benefit is given for a period of:
(a) 17 days (b) 39 days
(c) 91 days (d) 117 days

19. Sickness absenteeism is a useful index to assess:
(a) Working environment
(b) Sincerity of the workers
(c) Worker management relationship
(d) State of health of the workers

20. All of the following features are suggestive of asbestosis except:
(a) Occurs within five years of exposure
(b) The disease progresses even after removal of contact
(c) Can lead to pleural mesothelioma
(d) Sputum contains asbestos bodies

21. Bagassosis can be prevented by spraying:
(a) 10% acetic acid
(b) 5% acetic acid
(c) 1% propionic acid
(d) 2% propionic acid

22. According to "Factory Act, 1948" maximum permissible working hours per week are:
(a) 48 (b) 60
(c) 72 (d) 54

23. The Financial contribution for ESI comes from:
(a) State government
(b) Central government
(c) Employers'
(d) All of the above

24. Following are the chemical agents, which causes occupational dermatitis by local irritation except:
(a) Rubber (b) X-rays
(c) Lime (d) Ether

25. Most common mode of lead poisoning is:
(a) Ingestion (b) Dermally
(c) Inhalation (d) Faecal-oral

26. Chairman for ESI in India is:
(a) Prime Minister
(b) Union Minister of Health & Family Welfare
(c) Union Minister of Labour
(d) Union Minster of Human Resource Development

27. Under ESI Act, number of units for which a Family Dispensary must be opened is
(a) 500 (b) 1000
(c) 1500 (d) 2000

28. Occupational exposure to Benzol may lead to
(a) Lung cancer (b) Leukaemia
(c) COPD (d) Neurofibromas

29. The benefits of ESI Act include the following except:
(a) Medical benefit
(b) Rehabilitation allowance
(c) Sickness benefit
(d) Nutritional allowance

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30. Byssinosis is seen in:
(a) Cement factories (b) Textile industries
(c) Iron factories (d) Grain fields

31. Bagassosis occurs with:
(a) Cotton (b) Surgarcane fibres
(c) Carbon particles (d) Silica fibres

32. Silicosis occurs with:
(a) Cotton (b) Sugarcane fibres
(c) Carbon particles (d) Silica fibres

33. A person working in hot environment who consumes more H2O without salt is likely to develop:
(a) Heat stroke (b) Heat cramps
(c) Heat exhaustion (d) Heat hyperpyrexia

34. In ESI prograance, state government employee contributes to the fund. Employer's contribution is:
(a) 5.75% (b) 4.75%
(c) 3.75% (d) 2.75%

35. Benzene is associated with cancer of:
(a) Skin (b) Lung
(c) Bladder (d) Leukemia

36. "Snow-storm" appearance are seen in:
(a) Anthracosis (b) Silicosis
(c) Byssinosis (d) Bagassosis

37. Exposure to cotton dust causes:
(a) Byssinosis (b) Bagassosis
(c) Silicosis (d) Asbestosis

38. ESI Act includes all the following except:
(a) Small power using factories employing 10-19 persons
(b) Non power using factories employing 20 or more person
(c) Newspaper establishment
(d) Defence establishment

39. All are covered under ESI except:
(a) News paper workers
(b) Non power using factories with 18 members
(c) Small power using factories with 18 members
(d) Non power using factories with 20 members

40. Monday fever is associated with:
(a) Bagassosis (b) Byssinosis
(c) Asbestosis (d) Silicosis

41. Silicosis affects:
(a) Lower lobes of lungs
(b) Both
(c) Hilum of lungs
(d) Upper lobes of lungs

42. Respirable dust for pneumoconiosis:
(a) 0.1–5 m (b) 5–10 m
(c) 10–15 m (d) 15–20 m

43. Dust particle, in a industry is a:
(a) Biological hazards
(b) Chemical hazards
(c) Physical hazards
(d) Mechanical hazards

44. A 45-year-old man working in a coal mine since 15 years developed couth, dyspnoea on exertion and chest pain. His X-ray showed "snow – storm" appearance in lung fields. The most likely diagnosis is:
(a) Anthracosis (b) Silicosis
(c) Asbestosis (d) Siderosis

45. By the Factory Act the age for the child to work should minimum be (in years):
(a) 14 (b) 16
(c) 18 (d) 21

46. Which of the following is occupational lung disease but not pneumoconiosis?
(a) Brucellosis (b) Silicosis
(c) Anthracosis (d) Byssinosis

47. According to the factory Act (1948), minimum space each worker should have in a factory (in Cu.ft.) is:
(a) 100 (b) 200
(c) 400 (d) 500

48. What are the maximum permissible working hours (in work/person/week) according to the factory act?
(a) < 42 hours (b) < 48 hours
(c) < 56 hours (d) < 60 hours

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49. Particle size (in micron) at which the dust particles gets lodged in the respiratory tract?
(a) 5-10 (b) 0.5-3
(c) 0.5-0.1 (d) 3-5

50. Under ESIS act, the state government's share of expenditure on medical care is?
(a) 1/8 (b) 3/8
(c) 5/8 (d) 7/8

51. Minimum duration to developing coal minor pneumoconiosis:
(a) 2-4 years (b) 4-6 years
(c) 8 years (d) > 10 years

52. Which is not included in pneumoconiosis?
(a) Byssinosis (b) Bagassosis
(c) Anthracosis (d) Psittacosis

53. Occupational exposure that may cause sterility in females:
(a) Aniline (b) Lead
(c) Radon (d) Nickel

54. The clinical symptoms of lead toxicity are associated with blood levels of:
(a) 30 mcg/100ml blood
(b) 40 mcg/100ml blood
(c) 50 mcg/100ml blood
(d) 70 mcg/100ml blood

55. In ESI programme, state govt, employees contribute to the fund. Employer's contribution is:
(a) 5.75% (b) 4.75%
(c) 3.75% (d) 2.75%

56. Thermoactinomyces sacchari causes:
(a) Bagassosis (b) Siderosis
(c) Byssinosis (d) Anthracosis

57. Ergonomics is:
(a) Adjusting the Worker to his job
(b) Study of human behaviour
(c) Study of social mobility
(d) Study of health of female workers

58. Sickness benefit under ESI act extended into:
(a) 91 days (b) 61 days
(c) 1 year (d) 2 years

59. Most common heavy metal poisoning in the world:
(a) Lead (b) Arsenic
(c) Mercury (d) Cadmium

60. All are occupational cancers except:
(a) Liver ca (b) Bladder ca
(c) Lungs ca (d) Breast ca

61. Which of the following is true about ESI Act (1948)?
(a) Funeral charges put up to Rs. 50,000/-
(b) State government share is 1/8 and ESI Corporation is 7/8
(c) Employee contributes 8.75% and employer 3.75%
(d) Maximum limit for each family member is Rs. 30,000/-

62. According to The Workmen's Compensation Act, 1992, which of the following is considered an occupational disease?
(a) Typhoid (b) Anthrax
(c) Tetanus (d) Dengue

63. Main cause of Farmer's lung is due to microorganism:
(a) Pneumococcus
(b) Mycobacterium tuberculosis
(c) Micropolyspora faeni
(d) Staphylococcus aureus

64. Under ESI, a benefit which is NOT given in cash:
(a) Sickness benefit
(b) Medical benefit
(c) Maternity benefit
(d) Dependents' benefit

Answers MCQ On Occupational Health

1. Ans. (d) Bagassosis
2. Ans. (d) Depends on type of exposure
3. Ans. (c) 14
4. Ans. (b) 1000
5. Ans. (a) Coproprophyrin in urine
6. Ans. (a) Inhalation

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7. Ans. (a) Bagassosis
8. Ans. (a) High sputum AFB +ve
9. Ans. (b) Prickles
10. Ans. (c) Secondary Prevention
11. Ans. (d) A-III B-II C-IV D-I
12. Ans. (d) Vibration
13. Ans. (b) < 5 micron
14. Ans. (d) Bagassosis
15. Ans. (c) Farmer's lung
16. Ans. (b) Naphthylamines
17. Ans. (b) Occupational Health
18. Ans. (c) 91 days
19. Ans. (d) State of health of the workers
20. Ans. (a) Occurs within five years of exposure
21. Ans. (d) 2% propionic acid
22. Ans. (a) 48
23. Ans. (d) All of the above
24. Ans. (d) Ether
25. Ans. (c) Inhalation
26. Ans. (c) Union Minister of Labour
27. Ans. (b) 1000
28. Ans. (b) Leukaemia
29. **Ans. (d) Nutritional allowance**
30. Ans. (b) Textile industries
31. Ans. (b) Surgarcane fibres
32. Ans. (d) Silica fibres
33. Ans. (b) Heat cramps
34. Ans. (b) 4.75%
35. Ans. (d) Leukemia
36. Ans. (b) Silicosis
37. Ans. (a) Byssinosis
38. Ans. (d) Defence establishment
39. Ans. (b) Non power using factories with 18 members
40. Ans. (b) Byssinosis
41. Ans. (d) Upper lobes of lungs
42. Ans. (a) 0.1-5 m
43. Ans. (b) Chemical hazards
44. Ans. (b) Silicosis
45. Ans. (a) 14
46. Ans. (a) Brucellosis
47. Ans. (d) 500
48. Ans. (b) < 48 hours
49. Ans. (b) 0.5-3
50. Ans. (a) 1/8
51. Ans. (d) > 10 years
52. Ans. (d) Psittacosis
53. Ans. (b) Lead
54. Ans. (d) 70 mcg/100 ml blood
55. Ans. (b) 4.75%
56. Ans. (a) Bagassosis
57. Ans. (a) Adjusting the Worker to his job
58. Ans. (d) 2 years
59. Ans. (a) LeadHealth, Genetics and Health, Mental Health
60. Ans. (d) Breast ca
61. Ans. (b) State government share is 1/8 and ESI Corporation is 7/8
62. Ans. (b) Anthrax
63. Ans. (c) Micropolyspora faeni
64. Ans. (b) Medical benefit

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School Health Services

Syllabus

Health problems of school children. Aspects of school health services. Duties of school medical officers. Healthy environment in the school.

Learning objectives

1. State the Health problems of school children.
2. Mention the aspects of school health services.
3. Mention the duties of school medical officers.
4. Explain how to Maintain a healthy environment in the school.

Total - 5 hours (Lecture :2 hour, Non-lecture: 3 hours)
MCQ- Yes- SAQ (5 Marks)- Yes- LAQ (10 Marks)- No

School health is an important branch of community health. School health service in a way is continuation of MCH service. It provides an excellent opportunity to detect the defects in children at a very early stage, and carry out the remedial measures promptly.

School is a learning temple, but it exposes children to stress, strain, and hazards due to their diverse backgrounds and immunity status. They are vulnerable to communicable and noncommunicable diseases, making learning difficult and potentially causing personality and behaviour changes. Detecting and correcting these issues can help children cope with education and become promising adults.

Objective of school health service

1. Health promotion- To keep child physically fit and mentally alert to receive the education
2. Health protection- To protect the child from various communicable and noncommunicable disease
3. Health restoration- By early diagnosis by periodical screening and prompt treatment of diseases and their follow-up
4. Health education- To create health consciousness among children and also to inculcate healthy habits and practices.
5. Healthy living- In a healthy environment of school.

Components- The school health program has three major components health services, healthy environment and health education.

Health Services/ Aspects of School Health Service

These are designed to provide comprehensive health care such as preventive, promotive and curative services. The main activities are:

1. Health (appraisal)- Periodical medical examinations are conducted once a year, starting from admission. These thorough examinations include history, physical, anthropometric, and routine laboratory tests. Results are recorded in the school health record, and daily morning inspections are conducted to detect signs of illness. Screening procedures also detect visual, hearing, and dental defects. Record health problems, inform parents through teachers, and encourage treatment through school medical officers.

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2. Immunization- School children receive routine immunizations, including hepatitis B, typhoid, tetanus, and rubella vaccines, with a planned program.

3. First-Aid and Emergency care- Teachers provide emergency care for children injured or sick in school premises, such as injuries, fractures, unconsciousness, fits, vomiting and diarrhoea, etc. The teachers should have received adequate training during their training program.

4. Screening procedures: Evaluation of mental health, dental health, and vision and hearing defects is crucial for learning. Behavioural disorders, such as juvenile delinquency, are addressed through homework, habits, and guidance clinics, aiming to improve a child's overall well-being.

Dental health - Annual dental examinations assess dental health, detect and correct common problems like caries, malocclusion, and periodontal diseases.

Vision- Ophthalmologists screen for visual defects, treat squint, amblyopia, eye infections, and refractive errors.

Hearing: Hearing defects disrupt learning; audiometer detects and corrects.

5. Referral services- Children with visual, dental, hearing defects are referred to appropriate health agencies for better treatment and special clinics in rural areas.

6. Follow-up- Ensure child adheres to referral service.

7. Examination of teachers and other staff: Staff examined for diseases to prevent children's infection.

8. Maintaining records- Student cumulative record contains information on health status, services provided, and past and present health status, aiding evaluation of school health program.

Healthy Teaching and Health Education

This is the most important element of school health program. It does not merely imply inclusion of health lessons in the textbooks but also includes the following

a. Insisting on high standards of cleanliness in the school.
b. Improving water supplies and latrines and inculcating habits for their proper use.
c. Introducing healthy practical diets into school lunch program.
d. Demonstrating personal hygiene, such as cutting of nails, dressing of hair, bathing with soap and water etc.

Healthful school living-The school children spend most of their time in the school only, the environment must be healthy both inside and outside the school, so that the children should remain healthy, physically, mentally, socially, emotionally and culturally. School should be serving as model centre of good sanitation to the community.

The elements of healthful school living are-

1. School building with a playground and clean sanitation
2. Healthful teaching
3. Mid-day meal
4. Physical education procedures
5. Relation between the teacher and students among the students.

School building- Proper maintenance of the school building is even more important than the site and actual construction. The medical officer or sanitary inspector should be advice school authorities on different items of sanitation.

Location- School should be centrally located with proper approach roads and away from busy places, heavy traffic, factories, cinemas, market and railway tracks. It should have a compound. Preferably it should have ample space and good ventilation and a play-ground for games and physical exercises.

Classrooms- The classrooms should have verandas outside and be spacious inside. The minimum floor space per student should be 10-15 sq. feet. The height should be 12 feet. All classrooms should open into corridors 6-8 feet

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wide. The laboratories, if any, should have separate wing. There should be enough natural lighting, ventilating and sitting arrangements in all the class rooms. Black board should be such that there is no glaring.

Lighting- The class rooms should have sufficient natural light, preferably from the side and not front, because it will be dazzling to the eyes. If lighting id from behind, the students shadow falls on the desk.

Ventilation- The windows should be arranged in such a way that it should not only provide light evenly and sufficiently but also should facilitate cross ventilation in the room. Combined door and window area should be 40 per cent of the floor area. Improper ventilation facilitates transmission of diseases.

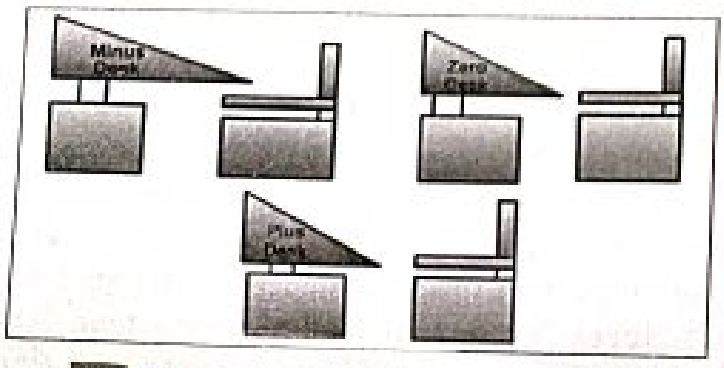
A good seat should be so adjusted in height that while sitting child's feet should be touch the ground with legs being vertical and thigh horizontal; about two-third of thigh beings on the seat. Back rest should be so curved as to be quite comfortable.

Sitting arrangement- If the desk-chair arrangement are improper, it results not only in the development of orthopaedic, postural and myopic defects, but also in the loss of interest in writing and reading, thus interfering with the learning process.

Zero Desk- It is one wherein the vertical line from the margin of the desk, touches the edge of the chair.

Plus Desk- it is one wherein there is a space between the edge of chair and the vertical line from the desk.

Minus desk- it is one wherein the vertical line from the desk falls on the chair.



From the point of view of health, desks should be of minus type, so that the pupil should be able to read and write without leaning forward and will have a good back rest which will in turn prevents postural defects. A plus type of desk, predispose for the development of myopia, contractor of chest, and spinal deformities.

Maintenance of healthy environment- This should be includes not only the sanitation of the school premises but also the surrounding, which has moral, physical and mental effect on the school child. The site should be dry, on raised ground, situated at distance from the road so as to minimise the nuisance of dust and noise and too much traffic.

Clean sanitation- Outside the school building and within the compound, environment is kept sanitary by providing protected water supply, sanitary disposal o refuse.

Water supply- There must be provision to supply clean and safe water, preferably from the independent source like tube well and the supply should be continuous through taps. There must be a minimum of one drinking fountain for every 100 students.

Latrines and Urinals- There must be one urinal for every 50 students and one latrine for every 100 students, separate for boys and girls.

Wash basin- There should be provision for wash-basin near water closets for cleaning the hands.

Refuse- All the wastes of class-rooms, verandas, and other rubbish collected from the dust-bins and disposed of by burning. Here and there, there must be receptacles with carbonized saw duet sand placed for spitting.

Healthful teaching- the daily teaching routine in the class must be arranged in such a way the classes should be interspersed with rest pause, games and physical exercises. The teaching classes should not be didactic, depressing, discouraging and boring to students, monotony is advised.

Play ground- It is must for recreation and physical education.

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Mid-day meal- since the school children are nutritionally vulnerable, development of malnutrition not only makes the child physically and mentally weak but also interferes with learning process. Thus malnutrition is a serious obstacle to take full advantage of schooling. Mid-day meals are,

1. It is a supplement and not a substitute for the home diet.
2. It should be provide at least 1/3rd of daily calorie requirement and about half of daily protein requirement.
3. The cost of the meal should be reasonably low.
4. The meal should be involve complicated cooking process
5. The menu is changed frequently to avoid monotony.

Physical education procedures-This is carried out under the supervision of physical education teacher. This physical education not only helps in the growth and development of the children, but also promotes a sense of team-work and discipline. Some of them become sports men and women.

Pupil-pupil relation and pupil- teacher relation- The healthy relation between the pupil and pupil not only helps in the development of behaviour pattern but also helps to retain the affection, throughout the rest of the life. Teacher can foster this relation better by encouraging group discussions, by handling the conflict situations, etc.

Health Education

This is another important component of school health program. The objective of the health education is to bring about changes in their knowledge; attitude and practice that promotes effective healthful living both at home and in the community. The teacher is the key to impart health education. It is directed at the health needs and interests of children. There are some areas of health education-

1. Personal hygiene
2. Prevention of diseases
3. First-aid
4. Safety education
5. Mental health
6. Nutrition education
7. Improvement of environmental sanitation
8. Consumer health
9. Adult health education
10. Family life education
11. Hazards of alcohol, tobacco, narcotics and such other drugs

Duties of School Medical Officers

The principal objective of the school medical officers is early detection and treatment of defects in the children. To avoid the strain and practical difficulty of annul medical check -up the school health committee.

1. To organize preventive measure and mass inoculated in case of out breaking of epidemics.
2. To arrange for periodic immunization of children.
3. To isolate and recommend quarantine of the children suffering from contagious disease.
4. To guide about the site of school building, its ventilation, lighting, and hygienic cleanliness and sanitary upkeep. He should inspect the school periodically to ensure proper cleanliness and other measures.
5. To guide the teachers, in principles of healthful living of children, and importance of hygiene cleanliness and first-aid training. A certain number of teachers can be trained to work as health guides to reduce the work load of medical officer.
6. Medical checkup of school children and upkeep of their medical records e.g. height, weight, nutrition, vision, hearing, dental, condition, and immunization.

Maintain a healthy environment in the school-

School is the place where children spend a long span of time every day. There are clear strategies to apply to assist in creating and maintaining a healthy atmosphere. It is the place where basic knowledge, manners, and etiquette are learned by

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a child. The surroundings of a school are very important because it affects the students and their progress to a great extent. The children in the school today will become responsible citizens of the nation in the future. Keeping a healthy environment is necessary for schools to accelerate the growth of children.

The core elements of a healthy school environment include access to healthcare, healthy food and physical activity, clean air and water and education about making healthy choices.

Every student has the right to access a clean and safe environment, both inside and outside. While educating children on the value of healthy eating and physical activity, schools should offer them chances for wholesome meals and physical activity, such as PE classes and playtime. It is possible to maintain facilities without using harsh chemicals. Playgrounds can offer a connection to nature and outdoor learning spaces, as well as an opportunity to contain rainwater and reduce neighbourhood flooding.

MCQ On School Health Services

1. The recommended desk(s) at school:
   (a) minus desk (b) plus desk
   (c) zero desk (d) both a & c
2. The most recommended desk at school is:
   (a) minus desk (b) plus desk
   (c) zero desk (d) both a & c
3. The desk not recommended at school:
   (a) minus desk (b) plus desk
   (c) zero desk (d) both a & c
4. Not the part of school health team:
   (a) school medical officer
   (b) public health nurse
   (c) senior medical officer
   (d) attendant
5. At school one sanitary latrine is recommended for:
   (a) 10 (b) 20
   (c) 30 (d) 50
6. It is not the duty of school medical officer:
   (a) to train teachers
   (b) to visit hostels
   (c) to go to the homes of children
   (d) to attend seminars
7. It is not aim and objective of school health service:
   (a) awakening health consciousness
   (b) promoting ethical values
   (c) provision of healthy environment
   (d) minimizing chance of spread of communicable diseases
8. The recommended area per students in the class room is:
   (a) 2 sq ft (b) 4 sq ft
   (c) 6 sq ft (d) 10 sq ft
9. Periodic routine examination of children at school is carried out annually at the following years except:
   (a) 5 (b) 8
   (c) 13 (d) 17
10. Components of school health services are
   (a). Health appraisal
   (b). Immunization
   (c). Healthy school environment
   (d). All

Answers of MCQ On School Health Services

1. Ans. (d) both a & c
2. Ans. (a) minus desk
3. Ans.(c) zero desk
4. Ans. (c) senior medical officer
5. Ans. (d) 50
6. Ans. (c) to go to the homes of children
7. Ans. (b) promoting ethical values
8. Ans. (d) 10 sq ft
9. Ans. (b) 8
10. Ans. (d)All

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Chapter 16

Disinfection

Syllabus

Definition of different term used in relation to disinfection. Types of disinfection. Natural agents, Physical agents and Chemical agents of disinfection. Recommended disinfection procedures of faeces & urine, sputum, and room. Ayurvedic disinfection methods.

Learning objectives

1. Define the term disinfection
2. Enlist and explain the types of disinfection.
3. Describe the Natural agents, Physical agents, and chemical agents of disinfection
4. Demonstrate the recommended disinfection procedures of faeces & urine, sputum, and room.
5. Explain Ayurvedic disinfection methods.

Total - 5 hours (Lecture :2 hour, Non-lecture: 3 hours)
MCQ- Yes- SAQ (5 Marks)- Yes- LAQ (10 Marks)- No

Semmelweis (1818-1865) and Lister (1827-1912) demonstrated the value of handwashing with antiseptic solutions, reducing puerperal fever and wound infections. Antiseptics and disinfectants remain crucial in the " golden age of antibiotics," controlling communicable diseases, sterilizing instruments, and treating skin and mucous membrane infections.

Sterilization -Validated process used to render a product free of all forms of viable microorganisms including bacterial spores. Sterilizer is the apparatus used to sterilize medical devices, equipment or supplies by direct exposure to the sterilizing agent.

Disinfection is the process of elimination of most pathogenic microorganisms (excluding bacterial spores) on inanimate objects. Disinfection can be achieved by physical or chemical methods. Chemicals used in disinfection are called disinfectants. Different disinfectants have different target ranges, not all disinfectants can kill all microorganisms. Some methods of disinfection such as filtration do not kill bacteria, they separate them out. Sterilization is an absolute condition while disinfection is not. The two are not synonymous.

Decontamination is the process of removal of contaminating pathogenic microorganisms from the articles by a process of sterilization or disinfection. It is the use of physical or chemical means to remove, inactivate, or destroy living organisms on a surface so that the organisms are no longer infectious.

Sanitization is the process of chemical or mechanical cleansing, applicable in public health systems. Usually used by the food industry. It reduces microbes on eating utensils to safe, acceptable levels for public health.

Asepsis is the employment of techniques (such as usage of gloves, air filters, UV rays etc.) to achieve microbe-free environment.

Antisepsis is the use of chemicals (antiseptics) to make skin or mucus membranes devoid of pathogenic microorganisms.

Bacteriostasis is a condition where the multiplication of the bacteria is inhibited without killing them.

Bactericidal is that chemical that can kill or

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inactivate bacteria. Such chemicals may be called variously depending on the spectrum of activity, such as bactericidal, virucidal, fungicidal, microbicidal, sporicidal, tuberculocidal or germicidal.

Antibiotics are substances produced by one microbe that inhibits or kills another microbe. Often the term is used more generally to include synthetic and semi-synthetic antimicrobial agents.

Sanitizer - Agent that reduces the number of bacterial contaminants to safe levels as judged by public health requirements. Commonly used with substances applied to inanimate objects.

Sterile- State of being free from all living microorganisms.

Germicide - Agent that destroys micro-organisms, especially pathogenic organisms.

Detergent - Surface cleaning agent that makes no antimicrobial claims on the label. They comprise a hydrophilic component and a lipohilic component. It acts by lowering surface tension e.g. soap which removes bacteria along with dirt.

Cleaning- Removal, usually with detergent and water or enzyme cleaner and water, of adherent visible soil, blood, protein substances, micro-organisms and other debris from the surfaces, crevices, serrations, joints, and lumens of instruments, devices and equipment by a manual or mechanical process that prepares the items for safe handling and/or further decontamination.

Deodorant- Deodorant is a substance which suppresses or neutralizes bad odours, e.g., lime and bleaching powder.

Properties of an ideal disinfectant

1. Broad spectrum: should have a wide antimicrobial spectrum.
2. Fast acting: should produce a rapid kill.
3. Not affected by environmental factors: should be active in the presence of organic matter (e.g., blood, sputum, faeces) and compatible with soaps, detergents, and other chemicals encountered in use.
4. Nontoxic: should not be harmful to the user or patient.
5. Surface compatibility: should not corrode instruments and metallic surfaces, and should not cause the deterioration of cloth, rubber, plastics, and other materials.
6. Residual effect on treated surfaces: should leave an antimicrobial film on the treated surface.
7. Easy to use with clear label directions.
8. Odourless: should have a pleasant odour or no odour to facilitate its routine use.
9. Economical: should not be prohibitively high in cost.
10. Solubility: should be soluble in water.
11. Stability: should be stable in concentrate and use dilution.
12. Cleaner: should have good cleaning properties.
13. Environmentally friendly: should not damage the environment on disposal.

Types of Disinfection

1. **Concurrent disinfection:** It is the application of disincentive measure as soon as possible after the discharge of infectious material from the body of an infected person, or after the soiling of articles with such infectious discharges.
2. **Terminal disinfection:** It is the application of disincentive measures after the patient has been removed by death or to a hospital or has ceased to be a source of infection or after other hospital isolation practices have been discontinued. Terminal disinfection is now scarcely practiced terminal cleaning is considered adequate, along with airing and sunning of rooms, furniture and bedding.
3. **Pre current disinfection:** Disinfection of water by chlorine, pasteurization of milk and hand washing may be cited as examples of pre current disinfection.

Natural Agents

1. **Sunlight :** The microbicidal activity of sunlight is mainly due to the presence of ultra violet rays in it. It is responsible for spontaneous sterilization in natural conditions. The sunlight is more effective in killing germs due to

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combination of ultraviolet rays and heat. By killing bacteria suspended in water, sunlight provides natural method of disinfection of water bodies such as tanks and lakes. Sunlight is not sporicidal, hence it does not sterilize.

2. **Heat :** Heat is considered to be most reliable method of sterilization of articles that can withstand heat. Heat acts by oxidative effects as well as denaturation and coagulation of proteins. Those articles that cannot withstand high temperatures can still be sterilized at lower temperature by prolonging the duration of exposure.
3. **Air:** exposure to open air acts by drying or evaporation of moisture which is lethal to most bacteria. In general, natural agents such as sunlight and air, because of their vagaries, cannot be totally depended upon for disinfection.

Physical Agents

1. **Burning :** Burning or incineration is an excellent method of infection. Inexpensive articles such as contaminated dressing, rags and swabs can be disposed off by burning. Addition of sawdust, paper, kerosene or other combustible material aid in burning. Faeces can be disposed off by burning. Burning should not be done in open air; it is best done in an incinerator.
2. **Hot air :** Hot air is very useful for sterilizing articles such as glassware, syringes, swabs, dressing, French chalk, oils, Vaseline and sharp instruments. The drawback of hot air is that it has no penetrating power, and is therefore not suitable for disinfection of bulky articles such as mattresses. Hot air sterilization is usually done in a hot air oven. The temperature of the air in the oven should be maintained at 160-180 deg. C. for at least one hour to kill spores. Unfortunately, such elevated temperature destroys plastic, rubber and other delicate substances.
3. **Boiling :** Boiling is an effective method of disinfection. It provides an atmosphere of boiling and steam. Boiling for 5-10 minutes will kill bacteria, but not spores or viruses. Boilers provide temperature above 90 deg.C.in an atmosphere of steam, which is exposed to open air. To ensure destruction of spores, temperature above 100 deg. C. would be required which cannot be achieved in boilers. Boiling is suitable for disinfection of small instruments, tools which are not used for subcutaneous insertion, lien, and rubber goods such as gloves.
4. **Autoclaving :** Sterilizers which operate at high temperature and high pressure called autoclaves. They generate steam under pressure which is the most effective sterilizing agent. Autoclaves fall into two categories-those with inner and outer chambers and those with single chambers. Basically, the autoclave works on the same principle as the domestic pressure cooker. Autoclaving is widely used in hospital and laboratory practice. It destroys all forms of life, including spores. Steam attains a higher temperature under pressure, has greater power of penetration than ordinary steam.
5. **Radiation :** Ionizing radiation is being increasingly used for sterilization of bandages, dressing, catgut and surgical instruments. The objects to be sterilized are placed in plastic bags before radiation, and they will remain sterile until opened. Ionizing radiation has great penetrating powers with little or no heating effect. This method is most effective, but very costly. Commercial methods of sterilization are normally carried out by gamma radiation. This technique requires special packing and equipment. It is now one of the requires special packing and equipment. It is now one of the most viable, safe and economic methods used today.

Chemical Agents

Articles which cannot be sterilized by boiling or autoclaving may be immersed in chemical disinfectants. Chemical agents may also be used for the disinfection of faeces, urine and other contaminated material.

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Phenol and related compounds

Phenol-Pure phenol or carbolic acid is the best known member of this group. On exposure to air, the colourless crystals of phenol become pinkish, and on longer exposure, the colour deepens to dark-red. Pure phenol is not an effective disinfectant. It is used as a standard to compare the germicidal activity of disinfectants.

Crude phenol-The phenol that is commonly used for disinfection is crude phenol, which is a mixture of phenol and cresol. It is dark oily liquid. It is effective against gram positive and gram-negative bacteria, but only slowly effective against certain viruses. Phenol disinfectants are not readily inactivated by organic matter. Its effect is greatly weakened by dilution. It should not be used in less than 10 percent strength for disinfection of faeces. In 5 percent strength, it may be used for mopping floors and cleaning drains.

Cresol- Cresol is an excellent coal-tar disinfectant. It is 3-10 times as powerful as phenol. Cresol is best used in 5-10 percent strength for disinfectant of faeces and urine.

Cresol emulsions-Cresol emulsified with soap is known as 'saponified cresol'. Lysol, Izal and Cyllin are cresol emulsions.

Chlorhexidine- This is one of the most useful skin antiseptics. Highly active against vegetative gram-positive organisms, and moderately active against gram positive microbes. It is soluble in water and alcohol. It is inactivated by soaps and detergents. 0.5 percent alcoholic solutions can be used as effective hand lotions. Creams and lotions containing 1 percent chlorhexidine are recommended for burns and hand disinfections.

Hexachloephane- This antiseptic is highly active against gram positive organisms, but less active against gram negative organisms.

Dettol- It is a relatively non-toxic antiseptic and can be used safely in high concentrations. It is more easily inactivated by organic matter than many other phenolic disinfectants. It is active against streptococci, but worthless against some gram-negative bacteria. Dettol 5 percent is suitable for disinfection of instruments and plastic equipment a contact of at least 15 minutes will be required for disinfection.

2. Quaternary ammonia compounds

Cetrimide - It is manufactured under the trade name "cetavlon". It is actively bactericidal against vegetative gram-positive organisms, but much less so against gram-negative organisms. Cetavlon is soluble in water; it has a soapy feel. It may be used in 1-2 per cent strength.

Savlon- Savlon is a combination of cetavlon and hibitane. Plastic appliances may be disinfected by keeping them in normal strength savlon for 20 minutes. Savlon 1 in 6 in spirit is more effective than savlon 1 in 20 aqueous solution. Clinical thermometers may be best disinfected in savlon 1 in 6 in spirit in just under 3 minutes.

3. Halogens and their compounds

Chlorine and chlorine compounds- They are potent bactericidal, fungicidal, sporicidal, tuberculocidal and virucidal. Since long time chlorine has been used as disinfectant in water treatment.

Bleaching powder (chlorinated lime)-It is white amorphous powder with a pungent smell of chlorine. A good sample of bleaching powder contains about 33 percent of "available chlorine". It kills most of the organisms when used the strength of 1-3 percent. Bleaching powder is widely used in public health practice in India for disinfection of water, faeces and urine and as a deodorant.

Drawback- Bleaching powder is unstable compound and loses its chlorine content storage.

Sodium hypochlorite -It acts in the same way as bleaching powder, but is stronger, containing 80,000 to 1,80,000 ppm of available chlorine. It corrodes metals.

Halazone tablets (chlorine tablets)-One tablet of halazone containing 4 mg halazone is sufficient to disinfect about 1 litre of water in about ½ to 1 hour.

Iodine-It is an alcoholic solution of 1-2 percent is still one of the most effective skin antiseptic available, but it stains the skin and may produce sensitivity reactions in some peoples. Plastic

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appliances like lippes loop may be sterilized by keeping in 1/2500 aqueous solution of iodine. Iodine is cheap, readily available and quick in action.

Iodophors- These are complexes of iodine and solubilizers, e.g. povidine-iodine(betadin), claimed to possess the same activity as iodine, but non-irritant, and do not stain the skin.

4.Alcohols- Ethyl and isopropyl alcohols are commonly used as antiseptic and disinfectants. Ethyl alcohol in the form of industrial methylated spirit is the alcohol most commonly used for skin disinfection and hand washing. Pure alcohol has no power of disinfection but when diluted to 70 percent strength, it is a good antiseptic.

5.Formaldehyde- More commonly known in solution as formalin formaldehyde is a highly toxic and irritant gas which precipitates and destroys protein. It is effective against vegetative bacteria, fungi and many viruses but only slowly effective against bacterial spores and acid fast bacteria. 2-3 percent solution for spraying rooms, walls and furniture. The gas may also be used for disinfection of blankets, beds, books, and other valuable articles which cannot be boiled.

6. Miscellaneous - Lime- It is the cheapest of all disinfectants. It is used in the form of fresh quick lime or 10-20 percent aqueous suspension known as "milk of lime". Faeces and urine can be disinfected by mixing 10-20 percent aqueous suspension of lime and allowing the disinfectant to act for 2 hours. Lime also used for treating walls. As a deodorant, lime is sprinkled in cattle sheds and public places where urinals and latrines are located.

Ethylene oxide- Heat- sensitive articles may be sterilized at 55-60 deg. C by ethylene oxide which kills bacteria, spores and also viruses.

Recommended Disinfection Procedures of Faeces & Urine, Sputum, and Room

For excreta, sputum, room (operation theatre), clinical thermometer, purulent and other discharges, bed-linen, blankets.

Disinfection procedure for faeces and urine- Excreta should be collected in impervious vessels and disinfected by adding equal quantity of, any of the following disinfectants. Faeces are broken with sticks to allow proper disinfection and allowed to stand for 1-2 hours.

1. 8% bleaching power solution (This is obtained by adding 50 gms of fresh bleaching powder with 33.3% available chlorine to 1 liter of water).
2. 10% Crude phenol (prepared by adding 100 ml of phenol to 1 liter of water).
3. 5% Cresol (by adding 50 ml to 1 liter of water).
4. 10% formalin (by adding 100 ml to 1 liter of water).

If any of these disinfectants are not available, at least equal amount of milk of lime (1 part of lime to 4 parts of water) may be added, mixed well and left for 2 hours. If that is also not available, a bucket of boiling water may be added to the feces, it is then covered and allowed to cool. After disinfection, the excreta is emptied into a water closet or buried in the ground.

Bed pans and urine cans should ideally be steam disinfected. They can be disinfected with 2.5% cresol for an hour after cleaning with boiling water. If none is available, they can as well be washed with soap and water. Burning a cotton ball soaked in spirit inside a bed pan is useful in a field/ emergency situation. Workers attending to this should wash their hands thoroughly with soap and water after attending to this and before eating or drinking.

Disinfection procedure for sputum (specially of tuberculosis patients): This is received in the gauze or paper handkerchiefs and destroyed by burning or it is buried in the earth far from human habitation. Alternatively, sputum may be received in a cup half filled with 5% cresol and when full it is allowed to stand for one hour and the contents are emptied and disposed off.

Disinfection procedure for room (operation theater/isolation ward): The isolation ward need to be disinfected after discharge or death of the

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patient. The doors and windows are kept open for several hours for good aeriation. Then the room is disinfected usually by all the three methods- mopping, spraying and fumigation. Floors and hard surfaces may be mopped with formalin solution (10%) or cresol (2.5%) or phenol (5%) and washed after a contact period of 4 hours. Furniture items may also be mopped with 5% formalin solution.

- Articles used by patients such as linen, clothes, etc. soiled with blood or deject, are disinfected before they are used by others. Such items are soaked in a solution of formalin (10.0%) or cresol (2.5%) or 5% phenol and then after the contact period, washed with soap and water followed by sun drying and ironing. Alternatively such linen and clothes are disinfected by boiling for half an hour or by steaming.
- Damageable goods of far and leather and also Woolen and silk fabrics may be disinfected by exposure to formaldehyde gas.
- Clinical thermometer is disinfected either by keeping it in surgical spirit or dettol or savlon solution. Hot water swab should never be used to clean the bulb of thermometer because the temperature reading shoots up.
- Paper, books and Woolen materials can be disinfected with hot air. Wrist watches can be disinfected with spirit.
- Utensils and crockery items can be disinfected by boiling for 5-10 minutes. Cutlery items specially knives, which may get blunt on boiling may be disinfected by immersion in 10% formalin or 2% lysol for 10 minutes before being washed and cleaned.
- Disposable items like tissue paper, gauze pieces, cotton swabs and rags may be directly disposed of by burning or incineration.

Disinfection procedure for needles and syringes: The following procedure is recommended after using the syringes and the needles but before disposal, till the facility of incineration or hot air oven becomes available.

a. Do not detach the needles from the syringes after use;
b. Aspirate disinfectant fluid into the syringe;
c. Immerse the syringe with attached needles in the disinfectant fluid horizontally in flat metal or glass tray or puncture proof plastic container.
d. Keep them immersed in the disinfectant fluid for at least 30 minutes;
e. The needles and syringes are then removed from the tray and destroyed mechanically before disposal;

Alternatively all the disposable material can be put in the hot air oven at a temp of 160 deg. C for 30-60 minutes. This will ensure that there will not be any possibility of its reuse.

Ayurvedic Disinfection Methods

Ayurveda has given much importance for preventive medicine and it has described several modes for disinfection purpose. Fumigation (Dhoopana) with various drugs is one such method which is safe, natural and cost effective. Drugs of herbal, herbo-mineral and animal origin containing volatile and antimicrobial constituents are used as single or in combination. Dhoopanavarthi (fumigation sticks) can be made out of drugs for easy administration.

Benefits

- It is used for disinfection of rooms and environment especially during rainy and winter seasons. It also helps in control of pests, rodents and insects and thus prevents outbreak of epidemics.
- Purifies and sterilises therapeutic rooms, puerperal and neonatal rooms.
- Used as a means of drug administration in disease conditions like wounds, fever, poisoning ENT diseases, gynecological and psychological disordersetc.
- Dhoopana done before storing of raw drugs and cereals helps to increase their shelf life and preserves potency.
- Disinfects vessels used for medicine preparation.

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- Clothes and other household items can be kept disinfected and sterile by fumigation method.

Commonly used drugs for fumigation purposes are: Guggulu resin (Commiphora mukul (Hook. ex Stocks) Engl.), Neem (Azadirachta indica *A.* Juss.), Sarsap/Indian mustard seeds (Brassica nigra *(L.)* K.Koch), Hingu (Ferula assa-foetida), Agaru (Aquilaria agallocha Roxb.), Kutki (Picrorhiza kurrooa *Royle),* Jatamansi (Nardostachys jatamansi (D.Don) *DC.),* Devdaru (Cedrus deodara (Roxb.) G.Don) etc.

Ayurvedic Disinfection methods of air: In Vedic literature, there are references of Homa-Havana and Yajna, sterilization of air by Agnihotra, sterilization of house and place around it by Dhoopana (Fumigation with medicated smoke). Fumigation with smoke of laksha (Ficus laccur), Haridra (Turmeric), Ativisha (Aconitum heterophyllum), Haritaki (Terminalia chibula), Kustha (Sassuria lappa), Valaka (Cinnamom tamala), Ela (Cardamom), Mustak (Cyprus rotundus), Priyangu are used to purify the air. Some other drugs like Guggula(Commiforamukul Engl.), Somraji(Psoralia corlifolia), Agaru(Aquilaria malaccensis), Nimba (Azadirachta indica) etc are also used to purify air.

Ayurvedic Disinfection methods of water: There are many methods of water treatment in Ayurveda. These are generally non- specific as in the present-day. The effects of different drugs advocated for purification of water against specific pathogenic microorganisms or harmful chemicals need to be researched. Hamsodaka is naturally purified water by rays of sun and moon along with the rise of Agastya star during Sharad Ritu (autumn). According to Acharya Sushruta water is purified by two ways Marjana and Prasadana. The highly polluted water should be disinfected through boiling, moderately polluted water by quenching red hot iron ball or sand and less polluted water by exposure to sun light. Many references in the texts on boiling water (Shrutashita jala) indicate the ancient people understood the relevance and importance of boiling water. Boiled water is known to be 'Wholesome' water and pacifies Tridosha.

The Ayurvedic recommendation for reducing the number of pathogens entering body is to boil water and allow it to cool. Some drugs are used to purify water like Kataka (Strichnus potatorum), Bisa Granthi (lotus/ water lily), Gaibal Moola (rhizomes of algae), Mukta (pearl), Chandrakanta Mani (moon stone), Gomedaka (cat's eye) etc. Protection from micro-organisms, can be obtained by filtering water through thick cloth.

Ayurvedic Disinfection methods of Land: Traditionally disinfection of land is performed by cleaning (sweeping), burning, by standing, grazing of cows, sprinkling of water (disinfectants), scraping and covering land. House can be purified by wiping, washing and white washing.51 The poisoned surface should be purified by sprinkling it over with a solution of Ananta (hemidesmus indicus) and Sarvagandha (the scented drugs) dissolved in wine (Sura), or with required amount of black clay dissolved in water or with the decoction of Vidanga (Emblia ribes), Patha (Cissampelos paieta), and Katabhi (balloon vine). Disinfection of surgical instruments: Disinfection of surgical instruments prior to surgery is mentioned by Acharya Sushruta. Incision is taken after proper heating of instruments; otherwise Paka (pus formation) takes place. Disinfection of surgical instruments is done by Payana technique.

Ayurvedic Disinfection methods of rooms: Sutikagara (room for parturient lady), Kumaragara (paediatric ward) Vranitagara (In patient ward) should be free from direct light, fierce wind, contaminated air, dust, smoke and with proper ventilation.

Ayurvedic Disinfection methods of Sutikagara (room for parturient lady)- The branches of Adani, Khadira (Acacia catechu Willd.), Karkandhu (Zyzyphus nummularia), Pilu (Salvadora persica Linn.), and Parushaka (Grewia asiatica Linn.) should be tied in the Sutikagara (Post-partal room). The plants of Nimba (Azadirachta indica), Tulasi (Ocimum sanctum), Vanatulasi (Ocimum basilicum) should be present in and around houses for prevention of disease and protection against unwanted harmful animals and

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insects. The fumigation by putting Nimbapatra (leaves of Azadirachta indica), Sarsapa (seeds of Brassica campestris), Sarjarasa (exudates of Shorea robusta Gaertn), Hingu (exudates of Ferula foetida Regel) etc. on charcoal or cow dung fire, repels insects, and disinfects houses. Vranagara (In patient ward), Kumaragara (paediatric ward) and Sutikagara (Room for parturient lady). The vaginal fumigation reduced infection rate in normal delivery with episiotomy.

Ayurvedic Disinfection methods of Kumaragara (paediatric ward): The protection neonate with various compound formulations, comprising of natural biocides and fumigants is advocated in classics. Fumigation of the garments, bed, and furnishings barley, mustard, Atasi (Linum usitaissimum Linn.- flax seed), Hingu (Ferula narthex Boiss.-asfoetida), Guggulu (Commifora mukul Engl.), Vacha (Acorus calamus Linn.), Choraka (Angelica glauca Edgw), Vayahstha (Bacopa monnieri Pennel.), Golomi (type of Vacha), Jatila (Nardostachys jatamansi D. C.), Palankasha (type of Guggulu), Ashoka (Saraca indica Linn.), Rohini (Picrorhiza kurroa royle ex Benth.) and Sarpa Nirmoka (sloughs of snakes) with ghee.

MCQ on Disinfection

1. Standard against which disinfectants are measured is:
   (a) Chlorine (b) Ozone
   (c) Phenol (d) UV Radiation
2. Chlorine exerts a disinfectant action in all except:
   (a) Bleaching powder
   (b) Cetrimide
   (c) Halozone tablets
   (d) Sodium hypochlorite
3. 'Savlon' contains:
   (a) Chlorhexidine and chlorxylenol
   (b) Cetavlon and chlorxylenol
   (c) Cetavlon and hibitane
   (d) Hibitane and chlorxylenol
4. Which of the following is not a sporicidal agent?
   (a) Glutaraldehyde (b) Formaldehyde
   (c) Chlorine dioxide (d) Cresol
5. Disinfection of water by routine chlorination can be classified as
   (a) Sterilization
   (b) Concurrent disinfection
   (c) Terminal disinfection
   (d) Pre-current disinfection
6. Sputum can be disinfected by EXCEPT:
   (a) Boiling (b) Burning
   (c) Drying (d) Autoclaving
7. Savlon contains
   (a) Cetrimide + chlorhexidine
   (b) Cetrimide + chlorhexidine + butyl alcohol
   (c) Cetrimide + butyl alcohol
   (d) Cetrimide + Cetavlon
8. Sputum is sterilized by all except:
   (a) Autoclaving (b) Boiling
   (c) Cresol (d) Chlorhexidine
9. Which of the following is used to test the efficiency of sterilisation of an autoclave?
   (a) Bacillus subtilis
   (b) Clostridium tetani
   (c) Bacillus stearothermophilus
   (d) Bacillus pumilus
10. The amount of bleaching powder necessary to disinfect choleric stools, is:
    (a) 50 gm/lit (b) 75 gm/lit
    (c) 90 gm/lit (d) 100 gm/lit
11. Sterilization and disinfection of blood spills is done by:
    (a) Formaldehyde (b) Sodium hypochlorite
    (c) Tincture iodine (d) Phenols
12. Syringes and glassware are sterilized by:
    (a) Irradiation (b) Autoclave
    (c) Hot air oven (d) Glutaraldehyde
13. Anti-viral agent is
    (a) Chlorhexidine (b) Betapropionolactone
    (c) Hypochlorite (d) Phenol

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14. All are Methods of sterilization by Dry heat except:
    (a) Flaming (b) Incineration
    (c) Hot air oven (d) Autoclaving
15. Disinfectant is one which:
    (a) Kills bacteria and spores
    (b) Kills bacteria only
    (c) Kills spores only
    (d) Kills viruses
16. Glass can be sterilized by
    (a) Incineration at 1050 degrees Celsius for 5-10 minutes
    (b) Hot air oven 121 degrees Celsius for 30-60 minutes
    (c) Autoclaving at 121 degrees Celsius for 30-60 minutes
    (d) Hot air oven 160 degrees Celsius for 30-60 minutes

Answers of MCQ on Disinfection

1. Ans. (c) Phenol
2. Ans. (b) Cetrimide
3. Ans. (c) Cetavlon and hibitane
4. Ans. (d) Cresol
5. Ans. (d) Pre-current disinfection
6. Ans. (c) Drying
7. Ans. (a) Cetrimide + chlorhexidine
8. Ans. (d) Chlorhexidine
9. Ans. (c) Bacillus stearothermophilus
10. Ans. (a) 50 gm/lit
11. Ans. (b) Sodium hypochlorite
12. Ans (c) Hot air oven
13. Ans. (c) Hypochlorite
14. Ans. (d) Autoclaving
15. Ans. (b) Kills bacteria only
16. Ans. (d) Hot air oven 160 degrees Celsius for 30-60 minutes

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Chapter 17

Primary Health Care

Syllabus

Definition of Primary Health Care. Principles and elements of primary health care. Levels of health care. Structure of Primary health care at village, sub-centre, Primary health centre (PHC), Community health centre (CHC) and Rural hospital levels. Primary health care in Health insurance. Private agencies, Voluntary health agencies, NGOs and the AYUSH sector. Role of Ayurveda in Primary Health Care.

Learning objectives

1. Define Primary Health Care.
2. Describe the principles and elements of primary health care and the levels of health care
3. Describe the Structure at village, sub-centre, PHC, CHC, Rural hospital levels
4. Describe primary health care in Health insurance, Private agencies, Voluntary health agencies, NGOs, and the AYUSH sector
5. Describe the role of Ayurveda in Primary Health Care.

Total - 3 hours (Lecture :2 hour, Non-lecture: 1 hours)

MCQ- Yes- SAQ (5 Marks)- Yes- LAQ (10 Marks)- Yes

Definition of Primary Health Care

Definition-It is essential care made universally accessible to individuals & Acceptable to them through their full participation & at a cost the community & country can afford.

Health is a fundamental human right, requiring state responsibility and global government efforts to enhance healthcare services. Primary health care strategy aims for universal health by 2000AD, developed at an international conference in 1978 in Alma Atta, Kazakhstan. Health care is the preventive, curative, restorative and promotive services provided by the official and non-official agencies of a country to its citizens.

Principles and Elements of Primary Health Care

Elements of Primary Health Care

1. Education concerning prevailing health problems & methods of preventing & controlling them
2. Promotion of food supply & proper nutrition
3. An adequate supply of safe water & basic sanitation
4. Maternal & child Health care
5. Immunization against major infectious diseases
6. Prevention & control of locally endemic diseases
7. Appropriate treatment of common diseases & injuries
8. Provision of essential drugs

Principles of primary health care

1. Equitable distribution
2. Community participation
3. Inter sartorial co-ordination
4. Appropriate technology

1. Equitable distribution-There should not be any difference between caste, sex, region, nationality, rich, poor, urban, rural, everyone should have facility for primary health. Primary health care strategy focuses on equity in health service distribution, ensuring equal access for all

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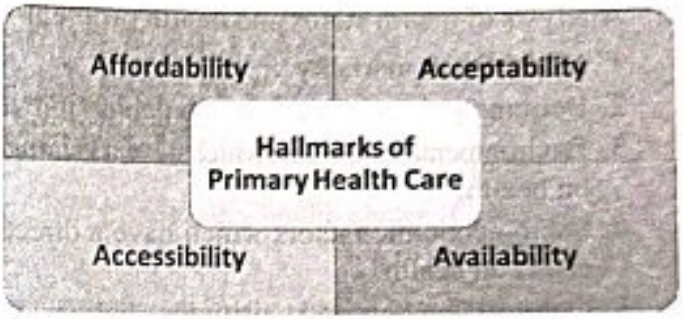
people, regardless of their ability to pay. Currently, health services are concentrated in major cities, causing social injustice and inaccessibility to rural areas. Primary health care aims to address this imbalance by shifting the focus from cities to rural areas and bringing services closer to people's homes.

2. Community participation-Local resources such as man, money, & material power are also essential e.g. Health guides, trained dais etc. Involvement of community, individual & family is the most essential aspect in community health along with the action of the State Government & Central Government. Community involvement in primary health care is crucial for universal coverage and promotes social awareness, self-reliance, acceptance, and reduced distance between providers and consumers. This involves active participation in planning, implementation, and maintenance of health services.

3. Inter sectorial co-ordination-Primary health care involves in addition to the health sector all related sectors and aspects of national & community development in particular agriculture, fisheries, animal husbandry, food industry, education, transport, housing, public works, voluntary agencies, communication & other sector.

4. Appropriate Technology- It is defined as scientifically sound, adaptable to local needs & acceptable to those who apply it and those for whom it is used, that can be maintained by the people themselves in keeping with the principle of self-reliance with resources the community & country can afford. Healthcare service technology must be appropriate, simple, scientifically sound, adaptable, culturally acceptable, economically cheaper, and operationally convenient.



Levels of health care

It is customary to describe health care service at 3 levels.

1. Primary care level
2. Secondary care level
3. Tertiary care level

These levels represent different types of care involving varying degrees of complexity.

1. Primary care level

Primary health care is the first level of contact with the national health system, providing essential care for individuals, families, and communities. This level addresses health problems and ensures effective care based on local needs and limitations. Indian primary health care is provided by primary health centres, village health guides, and trained dais, bridging cultural and communication gaps. Since 2000 AD, the system has been reorganized and strengthened for effective delivery of health care.

2. Secondary care level

Secondary health care in India focuses on complex problems, typically provided in district hospitals and community health centres as the first referral level.

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3. Tertiary care level

Specialized Hospitals, Apex Institutions, and India Institutes provide tertiary level care at the specialized level, requiring specialized health workers' attention. Follow-up care in the health system requires a two-way exchange of information, ensuring continuity and consumer confidence. However, in developing countries like India, this aspect remains weak.

Analysis of health status and health problem-

1. Morbidity & mortality.
2. Demographic conditions of the population.
3. Environmental condition which have a bearing on health.
4. Socio-economic factors which have a direct effect on health
5. Cultural background, attitudes, beliefs & practices which affect health.
6. Primary health care
7. Medical & health services available.
8. Other services available.

Health Problem

1. Communicable diseases problems.
2. Non-communicable disease problems.
3. Nutritional problems.
4. Environmental sanitation problem.
5. Medical care problems.
6. Population problems.

Communicable diseases problem

1. Malaria - during 2007 -1.53 million cases of malaria &1055 death.
2. Tuberculosis- As per the WHO Global TB Report 2011, there were an estimated 8.8 million incident cases of TB (range, 8.5million-9.2 million) globally in 2010, 1.1 million deaths.
3. Diarrheal diseases- 11.2 million cases of diarrhea each year. (Morbidity & mortality especially in children below 5 years).
4. Acute Respiratory Diseases-ARD are one of the major causes of mortality & morbidity in children below 5 years of age. 13% inpatients deaths in pediatric ward are due to ARD.
5. Leprosy- prevalence rate of about 0.72 per 10,000 populations. During year 2008-09 total 1.34 lakha new case were detected.

Filaria, AIDS, Kala Azar, Meningitis, Viral Hepatitis, JE, Enteric Fever are among the other important communicable diseases.

Non communicable diseases (NCDs). Diabetes Mellitus (DM), CVD's, Cancer, Stroke and chronic lung diseases. International diabetes federation, the number of people with diabetes in India around 40.9 million is expected to rise to 69.9 million by 2025. The total cancer cases are likely to go up from 979,786 cases in the year 2010 to 1,148,757 cases in the year 2020.

Nutritional Diseases

a) Protein-energy malnutrition-1 to 2 % in preschool age children.

b) Nutritional anemia-60-80 % of pregnant women is anemic. 19 % maternal deaths are attributed to anemia.

c) Low birth weight-28 % of babies born is low birth weight (less than 2.5 kg) in developing countries.

d) Xerophthalmia (nutritional blindness) - 0.04 % total blindness due nutritional deficiency of vitamin A.

e) Iodine deficiency disorders- Goitre & other IDD diseases in sub-Himalayan regions.

Environmental sanitation- The most difficult problem to tackle in this country is perhaps the environmental sanitation problem, which is multifaceted and multifactorial.

Medical care problem- financial resources are considered inadequate to furnish the cost of running such a service.

Population problem- Population problem is one of the biggest problems facing the country.

Resources

1. Health man power
2. Money & material
3. Time

1. Health man power- It includes both

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professional& auxiliary health personnel who are needed to provide the health care.

2. Money- It is an important resource for providing health services.

3. Time- A survey by WHO has shown that an nurse midwife spends 45 %of her time in giving medical care, 40% in Travelling, 5% on paper work and only 10% in performing duties for which she has trained.

Structure of Primary Health Care at Village, Sub-center, Primary Health Center (phc), Community Health Center (CHC) and Rural Hospital Levels

Health care services- The health is to improve the health status of the population. In India it is represent by five major sectors or agencies which differ from each other by the health technology applied and by the source of funds for operation.

1. Public Health Sector-

a) Primary health care

a. Primary health centres
b. Sub- centres

b) Hospitals/ Health centres

a. Community Health Centres
b. Rural Hospitals
c. District Hospitals
d. Specialist Hospitals
e. Teaching Hospitals

c) Health Insurance Schemes-

a. Employees State Insurance
b. Central Govt. Health Scheme.

d) Other Agencies-

a. Defence Services
b. Railways
c. Primary health care

2. Private Sector-

a. Private Hospitals, Poly Clinics, Nursing Homes & Dispensaries.
b. General Practitioners & Clinics.

3. Indigenous System of medicine

a. Ayurveda & Siddha
b. Unani & Tibbi
c. Homoeopathy
d. Unregistered practitioners

4. Voluntary Health Agencies
5. National Health Programmes

Primary Health Care in India

National Health policy based on primary health care approach to existence with the objective of "Health for all" by 2000.

1. Village level
2. Sub centre level
3. Primary health centre level (PHC)
4. Community health centre (CHC)

1. Village level

The health system connects with the community through non-medical personnel like Village health guides, Dai (Traditional birth attendant), and Anganwadi workers, bridging the gap between the health sector and the community.

They are working under the following schemes respectively:

a. ASHA Scheme
b. ICDS Scheme
c. Training of Local Dais

ASHA- (Accredited Social Health Activist)- ASHA must be the resident of the village a woman (married/widow/divorced) preferable in the age group of 25- 45 years with formal education up to 8th standard, having communication skills & leadership qualities.

Role & responsibility of ASHA-

- ASHA will take step to create awareness & provide information to the community on determinants of health such as nutrition, basic sanitation & hygienic practices, healthy living &working conditions, information on existing health services.
- She will counsel women on birth preparedness, importance of safe delivery, breast feeding & complementary feeding, immunization, contraception & prevention of common infections including STD.

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- ASHA will mobilize the community & facilitate them in accessing health & health related services available at Anganwadi/ sub centre/ PHC.
- She will accompany pregnant women & children requiring treatment / admission to the nearest PHC.
- ASHA will provide primary medical care for minor ailments such as Diarrhoea, fevers, first aid for minor injuries.
- She will be provider of DOTS (directly observed treatment short course) under RNTCP.
- She will also act as a depot holder for essential provisions like ORS, iron folic acid tablet, chloroquine, disposable delivery kit, oral pills & condoms.
- She will inform about the birth & death in her village & any unusual health problem.
- She will promote construction of household toilets under total sanitation campaign.

ICD scheme (integrated child development services) or Anganwadi Worker

- There is an Anganwadi worker for a population of 400-800. There are about 100 such workers in each ICDS project. As of date over 7,067 ICDS blocks are functioning in the country. Anganwadi worker selected from community she is expected to serve, she undergoes training in various aspects of health, nutrition, child development for 4 months.
- She is a part time worker and paid Rs. 1500 per month, for the services which includes checkup, immunization, supplementary nutrition, health education, non-formal pre-school education and referral services.
- It was initiated by Govt. of India in Ministry of social & women welfare in 1975.
- The beneficiaries are especially nursing mothers, pregnant women, other women (15-45 years), children below age of 6 years and adolescent girls. Along with village health guide, the Anganwadi worker are the community's primary link with the health services and all other services for young children.

Local dais - Under the rural health scheme. Local dais is trained to conduct delivery.

Training-

1. Basic concepts of maternal & child health, sterilization, & Obstetric skill are taught.
2. 30 days training is given with Rs. 300 per month stipend.
3. Training is conducted at PHC or sub centre or MCH for 2 days or week. Other 4 days she accompanies the female health worker.

After training-

- Delivery kit & certificate will be provided.
- She receives Rs. 10 per delivery. When registered at PHC or sub centre, for each infant registration, she gets 3 Rs.
- She plays an important role of family planning advices.

2. Sub centre level-

One sub centre is established for 5000 population generally and one for every 3000 population in hilly tribal and backward area. (Spread over 24km^2 area with a radial distance of 2.75 km.)

About 1.5 lakh sub centres are functioning in the country as of date.

It is equipped with one male and one female MPW (multipurpose worker)

The centre has two portions-a clinic portion and a residential portion. In the residential portion, only the HWF resides and the HWM resides outside. The clinic portion is meant for providing mainly MCH and Family Welfare services such as care of expectant mothers, including routine investigations like Hb percent and urine examinations, conducting deliveries, IUD fittings and immunizations.

Services provided-

1. Maternal health care
2. Child health care
3. Referral for safe abortion service.
4. School health service
5. Immunization
6. Family planning services.
7. National health programmes.

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Man power requirement

Manpower	Existing	Proposed
Health worker (female)	1	2
Voluntary worker to keep the sub center clean & assist ANM. Rs. 100/ month	1 optional	1 optional
Total	2/3	3/4

3) Primary health centre level

The centre which provides integrated curative, preventive and promotive aspects of health is known as primary health centre. One primary health centre for every 30000 rural population in the planes and one primary health centre for every 20000 population in Hilly, Tribal and backward areas. (Distributed over about 30 villages, spread over 24 km2 area with a radial distance of 2.75 km) There are about 25,000 PHCs functioning in the country as on March 2005.

Objectives of Primary health centre-

1. To provide comprehensive primary health care to the community through the Primary Health Centres.
2. To achieve and maintain an acceptable standard of quality of care.
3. To make the services more responsive and sensitive to the needs of the community.

Function of the Primary health centre

1. Medical care- OPD services, 24 emergency services, referral services and In-patient services.
2. MCH including family planning-antenatal care, intra-natal care, post-natal care, new born care etc.
3. Medical termination of pregnancy using manual vacuum aspiration technique.
4. Safe water supply & basic sanitation.
5. School health services
6. Adolescent health care
7. Prevention & control of locally epidemics diseases.
8. Collection & reporting of vital statistics.
9. Education about health.
10. National health programme.
11. Training of health guides, health worker, local dais & health assistants.
12. Basic laboratory services.
13. Selected surgical procedures

Staffing pattern-

Staff	Exis-ting	Recom-mended
Medical officer	1	3
AYUSH practitioner	Nil	1
Account Manager	Nil	1
Pharmacist	1	2
Staff Nurse or Mid Wife	1	5
Health worker female (ANM)	1	1
Block Extension educator	1	1
Health assistant male and female	2	2
Clerks (upper division and lower	2	2
division)		
Laboratory Technician	1	2
Driver Optional	1	
Class IV (peon/sweeper)	4	4
Total	15	24/25

Medical officer at PHC

1. He is the captain of health team. In the morning hours he treats the patient in out door. In afternoon he supervises the field work.
2. His tour programme is so designed as to cover all basic health services including family planning.
3. He will plan and implement UIP as per guidelines and ensure maximum possible coverage of the population in the PHC. He will ensure proper storage of vaccine and maintenance of cold chain equipment.
4. He will visit schools in PHC area at regular intervals and arrange for medical checkup and immunization.
5. He will organize and conduct tubectomy and vasectomy camps.
6. Organize training of all health personnel like ASHA, Anganwadi worker, dais etc.
7. He ensures that national health programmes

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are being implemented in his area properly.

8. He visits sub centres on fixed days & hours, provides necessary guidance. He plans, promotes, directs, supervises & co-ordinates as well as evaluator.

Health worker female (HWF)

Health worker female limits her activities among 350-500 families.

1. Registration of cases
2. Care at home
3. Care at PHC
4. Care in the community
5. Other health services

Health worker male (HWM)

1. Record maintenance.
2. Malaria, filarial Japanese Encephalitis, Kala-Azar etc. diseases identification and treatment
3. Communicable diseases
4. Leprosy identification
5. Tuberculosis identification
6. National blindness control programme
7. Environment sanitation.
8. Expanded programme on immunization
9. Family planning implementation.

Health assistants (male and female)

One health assistants supervise 6 health workers. The function includes administration, proper communication, strengthening knowledge and skills, supervision.

b) Hospitals/ Health centres

Community Health Centre- It is a 30 bedded hospital created by upgradation of an erstwhile PHC. One out of four PHCs is upgraded. Each community health centre (CHC) covers a population of about 1 lakh, distributed over about 100 villages. These are established to provide the services of specialists in surgery, medicine, obstetrics and gynaecology and paediatrics along with the facilities of laboratory, X-ray and blood bank.

Community Health Centres (CHC), which constitute the First Referral Unit (FRU) and function as Secondary level of health care.

Objectives

- To provide optimal expert care to the rural community.
- To achieve and maintain an acceptable standard of quality of care.
- To make the services more responsive

Manpower for community health centres.

Staff	Existing
Clinical manpower	
1. General surgeon	1
2. Physician	1
3. Obstetrician/ gynaecologist	1
4. Paediatrician	1
Existing support man power	
Nurse- mid-wife	7+2
Dresser	1
Pharmacist	1
Lab. Technician	1
Radiographer	1
Ophthalmic assistant	0-1
Ward boy/compounder	2
Sweepers	3
Chowkidar	5
OPD attendant	
Statistical assistant/data entry operator	
OT attendant	
Registration clerk	
Total essential	21-22+2

Service Delivery in Community Health Centres

Each CHC should provide the following assured services.

- Care of routine and emergency cases in surgery.
- Care of routine and emergency cases in medicine.
- 24-hour delivery services-both normal and assisted.
- Emergency and essential obstetric care including caesarean section.

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- Family planning services including laproscopic services.
- Safe abortion services.
- Newborn care.
- Routine and emergency care of sick children.
- Delivery of all National Health Program services.
- Other services like Blood storage services, Essential laboratory services, Referral (transport) services, Functional ambulance round the clock.

Job Description of Members of The Health Team

Medical Officer, PHC (Job description)

- He is the captain of the health team at the primary health centre. He devotes the morning hours attending to patients in the out-door; in the afternoon he supervises the field work.
- His tour programme is so designed as to cover all the basic health services including family planning.
- He will plan and implement UIP as per guidelines and ensure maximum possible coverage of the population in the PHC. He will ensure proper storage of vaccine and maintenance of cold chain equipment. He will ensure adequate supplies of vaccine and miscellaneous items required for the effective implementation of UIP.
- He will ensure proper implementation of IMNCI as per guidelines.
- He will visit schools in the PHC area at regular intervals and arrange for medical. check up and immunization.
- He will organize and conduct tubectomy and vasectomy camps.
- Organize training of all health personnel like ASHA, Anganwadi worker, Dais etc.
- He ensures that national health programmes are being implemented in his area properly.
- He visits each subcentre regularly on fixed days and hours and provides guidance, supervision and leadership to the health team.
- He spends one day in each month organising staff meetings at the primary health centre to discuss the problems and review the progress of health activities.
- The success of a primary health centre depends largely on the team leadership which the medical officer is able to provide. The medical officer must be the planner, the promoter, the director, the supervisor, the coordinator as well as the evaluator.

Hospitals

Apart from the primary health centres, the present organization of health services of the Government sector consists of rural hospitals, sub-divisional/tahsil/taluka hospitals, district hospitals, specialist hospitals and teaching institutions.

Rural Hospitals

It is now proposed to upgrade the rural dispensaries to PHC. At present a good number of PHCs are located at tehsil/sub-divisional/taluka headquarters. Such PHCs may be shifted to the interior rural areas. It is proposed to convert the Sub-divisional hospitals into Sub-divisional health centres so as to cover a population of 5 lakhs. These centres will have an epidemiological wing attached to them.

District hospitals- there are proposed to convert the district hospital into District Health Centre. Proposals to convert a district hospital into a District Health Centre are being considered. A hospital offers a mix of preventive, promotive, and curative services, while a health centre has a specific area and population. The role of the hospital in the community is currently being debated. The health centre's team consists of a mix of medical and paramedical workers, while the hospital's curative staff consists of doctors, compounders, and nurses.

Health insurance- There is no health insurance in India. Health insurance is at present limited to industrial workers & their families. The central government employees are also covered by the health insurance, under the banner "Central Govt. Health scheme".

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Employees state insurance scheme- ESI scheme introduced by an act of parliament 1948 in India. It has introduced for the first time in India the principle of contribution by employer & employee. The act provides for medical care in cash & kind, benefits in the sickness, maternity, employment injury & pension dependents on the death of worker because of injuries.

Central Government health scheme- 1st introduced in New Delhi 1954. The scheme is based on the principle of cooperative effort by the employee & employer to mutual advantage of both.

Facilities include

1. Outpatient care
2. Supply necessary drugs
3. Laboratory &X ray
4. Hospitalization facilities Govt. & private.
5. Specialist consultation
6. Paediatric services including immunization.
7. Antenatal, natal & post natal services.
8. Supply of optical & dental aids
9. Family welfare services.

Defence Services- Armed forces medical services the services provided are integrated & comprehensive embracing preventive, promotive, & curative services.

Railway Services- The railway provides comprehensive health care services through the agency of railway hospitals, health units & clinics.

Private agencies- Private practice of medicine provides a large share of the health services available.

Doctor population ratio as whole as 1: 1428.

Indigenous system of medicine- Indigenous system of medicine e.g. Ayurveda, Siddha, Homoeopathy etc. Ayurvedic physicians alone are estimated to be about 4.38 lakhs. Studies indicate that nearly 90 per cent of Ayurvedic physicians serve the rural areas. Most of them are local residents and remain very close to the people socially and culturally.

Voluntary Health Agencies/ Non-Governmental Organization (NGO)

A voluntary health agency may be defined as an organisation that is administered by an autonomous board which holds meetings, collects funds for its support chiefly from private sources and expends money, whether with or without paid workers, in conducting a programme directed primarily to furthering the public health by providing health services or health education, or by advancing research or legislation for health, or by a combination of these activities.

- Provide health care services to the community at large.
- Promotes research works of the related field.
- Creates awareness in the people about health and related matters.
- Special training for medical workers.

Main aim:

- Health care services
- Sharing burden of people with Govt. & Private practitioners

Advantages:

1. Better accepted
2. Community participation
3. Flexible and non-rigid programs
4. Work at fast pace and at low operative costs
5. Opportunity to those - interested in social work

Functions:

- **Supplement-** work of Govt. agencies such as by providing man power, materials & money.
- Pioneering
- Education
- Demonstrations & experimental projects
- Guarding
- Advancing Health Legislation

The Voluntary Health Agencies occupy an important place in community health programmes.

1. Indian red cross society
2. Hind Kusht Nivaran Sangh
3. Indian council for child welfare

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4. Tuberculosis association of India
5. Barat Sevak Samaj
6. Central social welfare board
7. The Kasturba memorial fund
8. Family planning association of India
9. All India women's conference.
10. The all India blind relief society
11. Professional bodies
12. International agencies.

Indian Red Cross Society

- Established in 1920-400 branches all over India.
- World Red Cross Day-8th May.
- Red Cross -Founder- John Henry Dunant

Objectives-

1. Improvement of health
2. Prevention of disease
3. Mitigation of sufferings

Activities:

1. Providing amenities to soldiers
2. Disaster relief services, earth quakes, floods, epidemics etc.
3. Blood banks
4. Promoting blood donation
5. Maternal and child welfare services
6. First aid services
7. Milk and medical supplies
8. Family planning

Hind Kusht Nivaran Singh (HKNS)

It was founded in 1950 with its headquarters in New Delhi. Indian council of British Empire Leprosy Relief association (BELRA) which renamed LEPRA in 1950

Function-

1. Financial assistance for leprosy homes, clinics, health education, poster, publication.
2. Training of medical workers, physiotherapists.
3. Conducting research, field investigation.
4. Conducting all India leprosy worker conferences.
5. Publication of a quarterly journal of leprosy in India.

Indian Council For Child Welfare

Established in 1952, affiliated to International Union for Child Welfare. Development of Indian Children physically, mentally, socially, morally and spiritually in a healthy & normal manner and in conditions of freedom and dignity.

Tuberculosis Association of India

It was started in 1939.

Aims and objectives are:

1. The prevention, control, treatment and relief of tuberculosis.
2. The encouragement of and assistance in the establishment throughout India of State Associations having objectives similar in whole or in part to those of the Association.
3. The affiliation or control of and the rendering of assistance to any institution having objectives similar in whole or in part to the objects of the Association.
4. The undertaking of the Research and Investigation on subjects concerning tuberculosis and allied chest diseases.
5. The doing of all such things as are incidental or conducive to the attainment of the above objectives.

Functions-

- Raises funds, trains doctors, health workers & social workers in anti-tuberculosis work.
- Health education to facilitate early diagnosis & consultation.

New Delhi tuberculosis centre, Lady lilinthgow sanatorium. At kousali, King Edward VII sanatorium at Dharampur and TB hospital at mehrauli.

Bharat Sevak Samaj

Nonpolitical & non official organization formed in 1952. One of the prime objectives of the Bharat Sevak Samaj (BSS) is to help people to achieve health by their own actions & efforts. BSS has branches in all the states & in nearly all districts.

Improvement of sanitation in village is one of the important activities of the BSS.

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Central Social Welfare Board

Autonomous body under the control of ministry of Education Set up by Govt. of India - August 1953

- Survey's needs & requirements of VHAs
- Promotes formation of Social Welfare organizations

Initiated family & Child Welfare Services-1968, in rural areas- mother craft, social education, literacy classes, distribution of milk, play centres for children. Industrial co-operatives in rural area.

Kasturba Memorial Fund (KMF)

After The death of Kasturba Gandhi in 1944, the fund was raised with the main object of improving the lot of women, especially in the villages, through gram sevikas. The trust has nearly a crore of rupees & is actively engaged in various welfare projects in the country.

Family Planning Association of India (FPAI)

Established in 1949, FPA India has been recognized as India's leading and largest reproductive and sexual health organization. It provides information on sexuality education and family life and a wide range of services in sexual and reproductive health including family planning, bringing health and happiness to millions.

Vision : FPA India envisions sexual and reproductive health for all as a human right, including gender equality leading to alleviation of poverty, population stabilization and sustainable development.

Mission : FPA India strengthens a voluntary commitment to advocate for sexual and reproductive health and Rights and, choices. It promotes access to SRH information and services related to family planning, safe abortions, HIV/AIDS and sexuality to poor, marginalized and vulnerable populations including young people.

All India Women's Conference

All India Women's Conference (AIWC) was founded in 1927 and registered in 1930 under the Societies Registration Act XXI of 1850. It is an organization dedicated to the upliftment and betterment of women and children.

- Runs MCH clinics
- Adult education center
- Milk centers
- Family planning clinics

The All-India Blind Relief Society

- The All-India Blind Relief Society was established in 1946
- Ophthalmic camps
- Coordination with other institutions & organizations for the blind

International Agencies

The Rockefeller foundation, ford foundation and CARE (cooperative for assistance and relief everywhere) are examples of voluntary international health agencies

Rockefeller Foundation

The Rockefeller foundation is a philanthropic organization chartered in 1913 and endowed by Mr. John D. Rockefeller. Its purpose is to promote the well-being of mankind throughout the world. The work of the Rockefeller foundation in India began in 1920 with scheme for the control of hookworm disease in the then Madras presidency.

It has given substantial aid to Virus Research Centre, Pune, All India Institute of Medical Sciences, Delhi, All India Institute of Hygiene and Public Health, Kolkata and several medical colleges, especially those at Vellore, Ludhiana and Lucknow. It also offers scholarships for advanced training of health professionals. It is providing active support to promotion of family planning, medical education and agriculture in India. It is currently supporting R and D for drugs for TB and AIDS in a big way. It has spent more than two billion dollars since its inception. Since its inception more than US 10 billion has been spent for grants and aid.

Ford Foundation

It was founded in 1936. It has provided assistance in various areas in health. Whereas the Rockefeller

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foundation earlier concentrated most of its assistance on universities and post-graduate institution, on professional education and on research, the Ford Foundation has been active in development of rural health services and family planning. Ford Foundation has helped India in following project-

1. Orientation training centers
2. Research-cu-action projects
3. Pilot project in rural health services
4. Establishment of national institution of health administration and education at Delhi.
5. Calcutta water supply and drainage scheme
6. Family planning programme

CARE (Cooperative for Assistance and Relief Everywhere)

Cooperative for Assistance and Relief Everywhere was founded in North America in the wake of the Second World War in year 1945. It is of the world's largest independent, non-profit, non-sectarian international relief and development organization. CARE provides emergency aids and long term development assistance. CARE began its operation in India in 1950. Till the end of 1980, the primary objective of CARE - India was to provide food for children in the age group of 6-11 years. From mid 1980s, CARE -India focused its food support in the ICDS programme and in development of pregame in the area of health and income supplementation.

NGOs and AYUSH Sector

NGOs (Non-Governmental Organization)-

1. Development and Operation of Infrastructure: Community-based organizations and cooperatives can acquire, subdivide and develop land, construct housing, provide infrastructure and operate and maintain infrastructure such as wells or public toilets and solid waste collection services.
2. Supporting Innovation, Demonstration and Pilot Projects :
3. Facilitating Communication
4. Technical Assistance and Training
5. Research, Monitoring and Evaluation
6. Advocacy for and with the Poor

Freedom from Hunger

This is an international development organization working in 14 countries across the globe. It brings innovative and sustainable self-help solutions to the fight against chronic hunger and poverty. It was established in1946.

Aga Khan Foundation

It was founded in 1967 by His Highness the Aga Khan. The foundation works in 11 countries including India. The overall program focuses on four major development areas-health systems, education including early childhood care and development, rural development and income generation to alleviate poverty and NGO enhancement.

Save the Children Fund

This UK based charity works in more than 70 countries. It was founded in 1919 to provide emergency relief to children suffering from malnutrition as a consequence of the First World War. Health care, education and welfare are the three main areas of work of this organization.

Oxfam

Oxfam is a confederation of autonomous NGO's committed to fight poverty and injustice in the world and work in many developing countries including India. Development activities and advocacy are the main planks of the work carried out by Oxfam.

Others Voluntary Organizations

Besides the above, there are many other international voluntary organizations doing very good work in the field of health. Some of these are listed below:

a. Population Council
b. International Planned Parenthood Federation
c. International Leprosy Association
d. International Agency for the Prevention of Blindness
e. International Union against Cancer

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f. World Federation of the Deaf.

AYUSH Sector

The Indian System of Medicine & Homoeopathy treatments are popular with the masses and have proven strengths of treating common and chronic diseases. In order to make available the benefits of AYUSH (Ayurveda, Unani, Siddha, Yoga & Naturopathy and Homoeopathy) to the public at large, it is very much important that adequate number of AYUSH health care units (hospitals and dispensaries) be available in all pockets of the country, so that the public may exercise their choice in accessing the health services.

Mission and Vision

1. The vision statement of Ministry of AYUSH is "to position AYUSH systems as the preferred systems of living and practice for attaining a healthy India."
2. The mission statement of Ministry of AYUSH is as follows: To mainstream AYUSH at all levels in the Health Care System.
3. To improve access to and quality of Public Health delivery through AYUSH System.
4. To focus on Promotion of health and prevention of diseases by propagating AYUSH practices.
5. Proper enforcement of provisions of Drugs & Cosmetic Act 1940 and Rules framed there under relating to the ASU drugs throughout the country.

Objectives:

The Ministry of AYUSH has the following objectives:-

1. Delivery of AYUSH Services
2. Human Resource Development in AYUSH
3. Promotion and Propagation of AYUSH Systems
4. Research in AYUSH
5. Conservation and cultivation of medicinal plants
6. Effective AYUSH Drug Administration

Role of Ayurveda in Primary Health Care

The Central Council for Research in Ayurvedic sciences (CCRAS), Ministry of AYUSH, Govt. of India an autonomous body for undertaking, coordinating, formulating, developing and promoting research in Ayurveda on scientific lines. The activities are carried out through its 30 Institutes/Centers/ Units located at different states across the Country and also in collaboration with reputed academic and research organizations.

The Broad areas of research comprise Medicinal Plant Research (Medico-ethno Botanical Survey, Pharmacognosy and Tissue Culture), Drug Standardization Research & Phyto-Chemistry, Pharmacological Research (Pre-Clinical, Safety/Toxicity and Bio-logical Activity Studies), Clinical Research, Literary Research & Documentation. The extension activities include Tribal Health Care Research, Health Care Services, Information, Education and Communication (IEC) etc. The Council's Institutional network includes 8 Institutes in Category 'A' at Gwalior, Cheruthuruthy, Kolkata, Chennai, Bhubaneswar, Hyderabad, Pune & Patiala; 6 in Category 'B' at Guwahati, Jhansi, Lucknow, Bangalore, Vijayawada & Leh; 6 in Category 'C' at New Delhi, Ahmadabad, Thiruvananthapuram, Bangalore, Mumbai & Nagpur; 10 in Category 'D' at Jaipur, Tarikhet, ALRCA Chennai, Gangtok, Mandi, Jammu, Patna, Itanagar, Port Blair and Nagaland.

What makes this system of medicine unique from other medical system is its philosophical touch and spiritual approach. It is evident from the ancient scriptures that the main aim of Indian system of medicine is the wellbeing of the entire universe - 'sarvesanthuniramaya.

Man is the one who rules over the earth and this human being is a part of the great and boundless universe .He is the miniature form of universe itself, and the whole universe is like a very big family- Vasudhaivakudumbakam.

He can be compared to the taproot, from which evolves the branches and whole tree itself. The branches symbolize the society and the tree, the

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universe. Only when the taproot is strong the tree will be able to withstand. Keeping in mind the simple logic. Ayurveda stressed up on the health of an individual, which will lead to the health of the society and the community, which will finally evolve as the health of the universe.

From this, we can see that it is clear that one of the main aims of Ayurveda is the promotion of primary health care. In ancient India country was divided into 'Janapadhas' and the health management of each Janapadha were thoroughly undertaken and the aims and objectives that can be employed to the long-term benefit of a healthy being was also elaborately dealt with. This proves that Ayurveda can play a significant role in the promotion of primary health. The presentation of Ayurveda is in such a manner, as to make the people aware of the health and its importance, that is possible only through health education.

Ayurveda the science of life has the primary aim like prevention of health in healthy individual and prevention of diseases. Ayurveda perspective of an ideal lifestyle include following Dinacharya, Rutucharya, Sadvritta all of which are instrumental in the prevention of disease and promotion of ideal health. Primary health care through Ayurveda is observation of daily routines (Dinacharya), seasonal conducts (Rutucharya), periodical body purification (Rutu Shodhana), night regimens (Ratricharya), right conducts of life (Sadavritta), proper diet (Ahara), good sleep (Nidra), sexual intercourse (Bramhacharya). Rasayana Sevan for healthy life and increases the immunity power, in pregnancy (Garbhini Charya), after delivery (Sutikakala Charya), paediatric care (Jatakarma and Bala Samskara) etc.

MCQ on Primary Health Care

1. One PHC is located for a population of:
   a) 5000 b) 30,000
   c) 100,000 d) 500
2. A subcentre in a hilly area caters to a population of:
   a) 1000 b) 2000
   c) 3000 d) 5000
3. Eligible Couple Register is maintained at:
   a) Subcentre b) PHC
   c) CHC d) District headquarters
4. One health assistant male/female should be posted for every:
   a) 5000 population b) 20000 population
   c) 30000 population d) 10 000 population
5. Elements of primary health care include all of the following except:
   a) Adequate supply of safe water and basic sanitation
   b) Prevention & control of local endemic diseases
   c) Providing employment to every youth
   d) Immunization against major infectious diseases
6. Panchayati Raj System is a 3-tier system of rural local self-government in India. Match the institutions with levels:
   A - Panchayat, I - Village level
   B - Panchayat Samiti, II - District level
   C - Zila Parishad, III - Block level
   a) A-III, B-II, C-I b) A-II, B-III, C-I
   c) A-I, B-III, C-II d) A-I, B-II, C-III
7. Principal Unit of Administration in India is:
   a) Centre b) State
   c) District d) Village
8. A sub-centre is manned by:
   a) Medical Officer b) Multipurpose worker
   c) Health Assistant d) Aanganwadi worker
9. Elements of primary health care include all of the following except:
   a) Adequate supply of safe water and basic sanitation
   b) Providing essential drugs
   c) Sound referral system
   d) Health Education
10. All of the following are Pillars of primary health care except:
   (a) Equitable distribution
   (b) Community Participation

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(c) Health Education
(d) Intersectoral Coordination

11. Alma Ata conference was held in:
(a) 1948 (b) 1956
(c) 1977 (d) 1978

12. Health man power indicated by which of the following:
(a) Doctor 1 per 3500 population
(b) ANM 1 per > 1000 population
(c) Lab technician 1 per 10000 population
(d) Pharmacist 1 per 100000 population

13. Population of 1000 is covered by:
(a) Anganwadi worker (b) Health assistant
(c) Trained Dai (d) Nurse

14. Function of PHC are EXCEPT:
(a) Referral services
(b) Family planning & referral services
(c) Basic laboratory services
(d) Specialist service

15. Which of the following is the suggested norm for nurses In Indian population?
(a) 1 per 1000 (b) 1 per 2000
(c) 1 per 3000 (d) 1 per 5000

16. Function of Health worker female:
(a) Perform 50% of deliveries
(b) Trains dais (c) Chlorination of water
(d) Collectors of urine samples

17. Functions of female health worker includes:
(a) Visit 4 subcentres/month Health Assistment
(b) Enlist dais of the sub-centre
(c) Chlorination of water Health worth male
(d) Collection of urine sample

18. All of the following are state responsibility for health except:
(a) Vital statistics
(b) Promotion of research through research centres & other bodies
(c) Prevention of adulteration
(d) Prevention of communicable disease

19. ASHA is posted at the:
(a) Village level
(b) Community Health Centre
(c) Primary Health Centre
(d) Sub-centre

20. Which of the following is a new concept in primary Health Care?
(a) Equitable distribution
(b) Community participation
(c) Qualitative enquiry
(d) Primary Health Care

21. Principles of Primary Health Care includes all except:
(a) Intersectoral coordination
(b) Appropriate technology
(c) Mainly coordinated by doctors
(d) Community participation

22. Following is/are the job(s) of Health worker male except:
(a) Sputum collection (b) ORS distribution
(c) DOTS supervision (d) Growth monitoring

23. Staff at PHC include except:
(a) Pharmacist (b) Clerk
(c) Radiologist (d) Laboratory technician

24. Which of the following is not a work of female multipurpose health worker?
(a) Malaria surveillance
(b) Distribution of condoms
(c) Immunization (d) Dots activities

25. With of the following is at sub-centre level?
(a) Zila parishad (b) Panchayat samiti
(c) Gram panchayat (d) Gram sabha

26. Highest level of integration in health service is
(a) PHC (b) Sub centre
(c) CHC (d) District hospital

27. Which of the following is true about female health worker?
(a) Acts at PHC level
(b) Covers a population of 5000 population
(c) Chlorinates well at regular intervals
(d) Makes at least 3 post natal visits for each delivery

28. How many beds are there in PHC for indoor patients?
(a) 2
(c) 6 (b) 3
(d) 8

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29. Community health centre covers a population of:
(a) 10,000 to 20,000 (b) 30,000 to 50,000
(c) 50,000 to 80,000 (d) 80,000 to 120,000

30. Emphasis shifted from urban to rural services:
(a) Equitable distribution
(b) Community participation
(c) Intersectoral coordination
(d) Community participation lth Care in India, Health Planning and Management

31. Female health worker:
(a) Cover 100 population
(b) Covers 1000 population
(c) Covers 5000 population
(d) Covers 30000 population

32. Which of the following is not a work of Anganwadi worker?
(a) Immunization of children
(b) Non formal preschool education
(c) Sanitation
(d) Health education

33. Minimum number of beds in community health centre:
(a) 4-6 (b) 15
(c) 30 (d) 100

34. Most common operation done by an Ophthalmologist in district hospital:
(a) Phacoemulsification
(b) Trabeculectomy
(c) Bilateral lamellar tarsal rotation
(d) Dacrocystorhinostomy

35. Staff at PHC include:
(a) Radiographer (b) Pharmacist
(c) Anesthetist (d) Pediatrician

36. Multipurpose health worker works for population:
(a) 1000 (b) 3000
(c) 100 (d) 5000

37. Functions of female health worker includes:
(a) Visit 4 sub-centres/month
(b) Collection of blood sample
(c) Conduct 50% delivery
(d) Chlorination of water

38. Following are Objectives of Indian Public Health Standards for Primary Health Centres except:
(a)Provision of comprehensive primary health care
(b)Achievement of an acceptable quality of health care
(c)Provision of accident and emergency care
(d)Making services more responsive to the needs of the community

39. Optimum unit of Preventive, Curative and Promotive services in Health Care is known as
(a) Appropriateness (b) Availability
(c) Adequacy (d) Comprehensiveness

40. One village health guide is for population of:
(a) 1000 (b) 5000
(c) 10000 (d) 50000

41. A subcentre caters the population of:
(a) 5,000 (b) 10,000
(c) 50,0000 (d) 1 lac.

42. Vaccine can be stored at subcentre for:
(a) 1 day (b) 7 days
(c) 15 days (d) 30 days

43. An ideal sub centre for a rural population should cater a population of:
(a) 1000 (b) 2000
(c) 5000 (d) 10000

44. An subcentre for a population in plains should cater:
(a) 1000 (b) 2000
(c) 5000 (d) 10000

45. Primary health care involves all except:
(a) Sanitation & water supply
(b) Sound referral centre
(c) Supply of essential drugs
(d) Health education

46. Village health guide scheme in introduced in:
(a) 1960 (b) 1970
(c) 1980 (d) 1990

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47. "Mobile medical care" is provided services to all except:
(a) Primary health care
(b) Secondary health care
(c) Tertiary health care
(d) Near home based

48. Community health centres covering a population of:
(a) 40 - 60,000 (b) 60 - 80,000
(c) 80 - 1,20,000 (d) None

49. In Hilly area PHC caters population of:
(a) 20,000 (b) 30,000 (c) 3,000 (d) 5,000

50. An example of secondary health care level would be:
(a) Primary Health Center
(b) Sub center
(c) Community health center
(d) Aped health institutions

51. Which of the following is not a function of primary health center in India?
(a) Medical Care
(b) Safe water supply
(c) Collection of vital statistics
(d) Supplementary functioning of under six children

52. Recommended numbers of population for primary Health Centres for a tribal area is:
(a) 50,000 (b) 30,000
(c) 20,000 (d) 10,000

53. Recommended number of populations for primary health centers & sub centers for tribal area is:
(a) 30,000 & 5000 respectively
(b) 20,000 & 3000 respectively
(c) 30,000 & 3000 respectively
(d) 20,000 & 5000 respectively

54. Anganwadi worker demonstrating preparation of home made ORS to the mothers of under five children, is an example of?
(a) Intersectoral coordination
(b) Community participation
(c) Appropriate technology
(d) All of the above

55. All are grass root level worker except:
(a) Anganwadi worker
(b) Village health assistant
(c) Dai
(d) Health assistant

56. A trained Dai caters for a population of:
(a) 1000 (b) 2000
(c) 3000 (d) 4000

Answer of MCQ on Primary Health Care

1. Ans. (b) 30,000
2. Ans. (c) 3000
3. Ans. (a) Subcentre
4. Ans. (c) 30000 population
5. Ans. (c) Providing employment to every youth
6. Ans. (c) A-I, B-III, C-II
7. Ans. (c) District
8. Ans. (b) Multipurpose worker
9. Ans. (c) Sound referral system
10. Ans. (c) Health Education
11. Ans. (d) 1978
12. Ans. (c) Lab technician 1 per 10000 population
13. Ans. (c) Trained Dai;
14. Ans. (D) Specialist service
15. Ans. (d) 1 per 5000
16. Ans. (a) Perform 50% deliveries;
17. Ans. (b) Enlist dais of the sub-centre
18. Ans. (b) Promotion of research through research centres & other bodies
19. Ans. (a) Village level
20. Ans. (c) Qualitative enquiry
21. Ans. (c) Mainly coordinated by doctor
22. Ans. (d) Growth monitoring
23. Ans. (c) Radiologist
24. Ans. (a) Malaria surveillance
25. Ans. (c) Gram Panchayat
26. Ans. (d) District hospital
27. Ans. (b) Covers a population of 5000 population
28. Ans. (c) 6
29. Ans. (d) 80,000 to 120,000

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30. Ans. (a) Equitable distribution
31. Ans. (c) Covers 5000 population
32. Ans. (c) Sanitation
33. Ans. (c) 30
34. Ans. (a) Phacoemulsification
35. Ans. (b) Pharmacist; (e) Laboratory technician
36. Ans. (d) 5000
37. Ans. (c) Conduct 50% delivery
38. Ans. (c) Provision of accident and emergency care
39. Ans. (d) Comprehensiveness
40. Ans. (a) 1000
41. Ans. (a) 5,000
42. Ans. (a) 1 day
43. Ans. (c) 5000
44. Ans. (c) 5000
45. Ans. (b) Sound referral centre
46. Ans. (c) 1980
47. Ans. (c) Tertiary health care
48. Ans. (c) 80 - 1.20,000
49. Ans. (a) 20,000
50. Ans. (c) Community Health Centre
51. Ans. (d) Supplementary functioning of under six children
52. Ans. (c) 20,000
53. Ans. (b) 20,000 & 3000 respectively
54. Ans. (c) Appropriate technology
55. Ans. (d) Health assistant
56. Ans. (a) 1000

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Chapter 18 Mother and Child Health Care

Syllabus

Objectives of Maternal and Child Care services. MCH problems & indicators of MCH care.

Learning objectives

1. Describe the objectives of Maternal and Child Care services.
2. Explain the MCH problems & enlist the indicators of MCH care

Total - 2 hours (Lecture :1 hour, Non-lecture: 1 hours)
MCQ- Yes- SAQ (5 Marks)- Yes- LAQ (10 Marks)- No

Maternal and child health care is one of the main components of (PHC) systems as declared at the Alma Ata Conference in 1978. In India women of child bearing age 15-44 years and children under 15 years constitute 57.5 % of total population.

Maternal and child care services provided by the MOH, UNRWA and NGOs together services are free of charge

MCH services

Are the Sites where women and children seek their preventive and curative services. It is a PHC component where these services should be available affordable and accessible to all the target population in their communities.

Objectives of MCH

1. Reduction of maternal, perinatal, infant and childhood mortality and morbidity.
2. Promotion of reproductive health.
3. Promotion of physical and psychological development of the child and adolescent in the family.

Aspects of the programme-

1. Maternal care
   a. Antenatal care
   b. Intra natal care
   c. Postnatal care
2. Child health-
   a. Infant- neonatal and post neonatal care
   b. Care of preschool child
   c. Care of school going child

Components of MCH Activities

Women health-

- Provision of antenatal care including regular examination immunization-proper nutrition and self-care
- Provision of safe delivery site
- Postnatal follow up
- Family planning services
- Health education (counseling)

Child health-

- Growth and development monitoring including proper nutrition with emphasis on breast feeding. (Well baby clinic)
- Immunization of all children.
- Screening of all newborns for phenyl ketonuria (an inherited inability to metabolize phenylalanine which, if untreated, causes brain and nerve damage) and congenital hypothyroidism.
- Health education to ensure healthy children.
- Early discovery of congenital abnormalities.

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Maternal and Child Welfare Centre

These centres are established under the supervision of medical officers of the health. The essential provision for centre is a well-equipped lady health visitor, who is assisted by a trained Dai.

The centre should consist of :

1. A waiting room
2. A consultation room
3. A small dispensary
4. A washing room
5. A lavatory adjoining the waiting room
6. Staff quarters for the lady health visitor/ mid-wife/ ANM and trained Dai in close proximity to the welfare centre.
7. A large compound for use as playground for the children.

The staff should consist of-

1. A lady visitor and mod-wife/ANM one lady health visitor annually attends to about 200-240 births 200 infants and about 600-700 preschool children. A mid-wife/ ANM can attended to 100 births.
2. A lady superintendent- she is a voluntary honorary lady worker, who can afford to spare some time to assist the lady health visitor in her work.
3. A visiting lady medical officer- she attends the centre once or twice in a week. She is specialist in diseases of women and children and runs antenatal and baby clinics.
4. Dais- One or two trained dais and mid wife are attached to the centre to render assistance at the time of delivery to poor and deserving mothers.
5. Specialists- In some of the centres venereal, orthopaedic or dental specialists also attend the centre one or twice a fourth night. The chief value of the centre is to provide medical and hygienic advice to the mothers who should be used and persuaded to bring their children to the centres for periodical checkup. Leaflets in different languages should be distributed giving instructions regarding maternity and child welfare work.

Annual baby show may be held in the centres. Some centres will provide cheap meals for poor expectant and nursing mothers. Milks also will supply free or at a nominal cost to needy mothers and children. In some centres dental or venereal clinic and clinic for orthopaedic work and ultra violet treatment are also provided.

Maternal Health

Definition (WHO) Maternal health refers to the health of women during pregnancy, childbirth and the postpartum period.

Objectives of the program-

1. To provide optimal antenatal care to pregnant women as early as possible.
2. To prevent and detect any deviation on the normal pattern in of pregnancy.
3. To identify and give special attention and care to pregnant women at risk.
4. To ascertain outcome of each registered pregnancy and follow up on the survival of new born infants.
5. To reduce maternal deaths by early detection and management of risk factors and complications.
6. To ensure that optimal standard of care are provided to high risk pregnant women during delivery by extending assistance towards their hospitalization costs.
7. To prevent adverse development that may arise after childbirth by providing postnatal care either at home or in MCH clinic as early as possible and within 42 days.
8. To promote birth spacing by avoiding too early, too late, too frequent and too close pregnancies by provision of comprehensive family planning services to women (counseling and supplies.
9. Encourage women to share responsibility of own health and maintaining healthy life style such as weight control, physical exercise.

Elements of maternal health

1. Antenatal care.
2. Natal care.

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3. Postnatal care.
4. Family planning.
5. Family health counselling

Antenatal Care

- Antenatal care is the health care given to the pregnant women from the first month till the delivery time. to insure safe pregnancy and safe outcome.
- The outcome is referred to safe delivery and healthy newborn.
- The objective of antenatal care is to assure that every wanted pregnancy culminates in the delivery of a healthy baby without impairing the health of the mother.
- Good antenatal care is vital for achieving the objectives stated later on. Bad antenatal care may be worse than none.

Objectives of antenatal care

1. To maintain the mother and babies in the best possible state of health.
2. To recognize abnormalities and complications at an early stage.
3. To educate the mother in the physiology of pregnancy.
4. Antenatal care is the cornerstone of obstetrics. Though the problems of labour are more dramatic and demand attention, many of them could be avoided by effective detection and management of antenatal variations from the normal.

Activities

1. General medical and obstetric history
2. Routine physical examination including: General and abdominal examination, Blood pressure and weight are routine measurements during each visit.
3. Level of the uterus is defined each visit after the 12th week of pregnancy.
4. Health education: Assessment of the educational needs of the woman related to her history and the physiological changes occurring in her body.
5. Topics: Nutrition, Personal hygiene, Care of nipples, Awareness about signs and symptoms associated with high risk pregnancy, physiology of pregnancy.
6. Provision of supplements including ferrous tablets and folic acid tablets
7. Laboratory tests: Complete blood examination including hemoglobin level, fasting blood sugar, blood group and Rh factor. Urine examination for the presence of albumin, sugar and infection.
8. Immunization: Tetanus toxoid should be given for all pregnant women (primi gravidas). The first does is usually given at 20 weeks of pregnancy. The second does is given 5 years later.
9. Curative services where women are treated for acute illness such as treatment of the uro-genital tract infection.
10. Assessment of risk pregnancy: During ante-natal care women are classified according to the risks associated with the pregnancy.

Risk factors Medical conditions

Diabetes mellitus, Anaemia, Hypertension, Urinary tract infection, Heart disease, Epilepsy, Variety of problems related to drug usage and conditions treated.

Risk factors related to past obstetric history- History of operative delivery, History of a stillbirth or neonatal death, previous ante-partum hemorrhages, previous post-partum, hemorrhages, History of low-birth-weight infant.

Natal Care

- Natal care is referred to the care given to women during childbirth.
- Caring for woman in labour demand sensitivity and awareness of her perceptions of labour and of her needs as they relate to her experience.
- Delivery sites should be- Hygienic, Well equipped, have qualified trained persons.
- These sites could be in hospitals or delivery hospitals or in the community either in primary health care centres or separate maternity homes

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- Natal care should not be limited to the delivered women but care should be given to the newborn at the same time.

Postnatal Care

Care of mother after delivery is known as post-natal or post partal care. This can be broadly divided into care of mother & care of new born.

Objectives

1. To prevent complication of post partal period.
2. To provide complications of restoration of the mother to optimum health.
3. To check adequacy of breast feeding.
4. To provide family planning services.
5. To provide basic health education to mother / family.

To prevent complication of post partal period- Puerperal sepsis, thrombo-phelbitis, secondary hemorrhage & urinary infection should be handled with care.

Complications of restoration of the mother to optimum health- So physical examination should be done properly. Anemia should be treated by iron & folic acid supplement. If necessary, calcium supplement should also be given.

Adequacy of breast feeding- Immediately after the birth of the new born, breast feeding is suggested. Infant is dependent completely on breast milk up to 4-6 months. Later supplementary food are necessary for the proper growth of the child.

Family planning services- It is most essential because it will be a burden for the mother if she conceives with in the first year.

Basic health education

1. Hygiene- personal & environmental
2. Pregnancy spacing-
3. Important health checkup & birth registration.

Appropriate Care For Children-

The children belonging to 0-14 years are included. Total population of children divided into three groups depending on age.

1. Infants-
   a. Neonatal (first 28 days after birth)
   b. Post neonatal (28th day to 1 year)
2. Preschool children (1-4 years)
3. School going children (5-14 years)

Neonatal Care

- Early neonatal care- the first week of life is the most crucial period in the life of infant.
- In India 61.3 % of all infants deaths occur within the first month of life.
- More than of death is greatest during the first 24-48 hours after birth.
- The problem is more acute in rural areas where expert obstetric care is scare. Environment condition baby is born are usually unsatisfactory.

Objectives

1. Establishment & maintenance of cardiac respiratory functions.
2. Maintenance of body temperature.
3. Avoidance of infection.
4. Establishment of satisfactory feeding regimen.
5. Early detection & treatment of congenital disorder, especially infections.

Immediate care after delivery

1. Clearing the airway- establishment & maintenance of cardiac respiratory functions is most important thing moment the baby is born. To help establishment breathing, the airways should be cleared of mucus & other secretions.

2. Neonatal care (APGAR Score)

Sign	Score-0	1	2
Heart rate	Absent	Slow (below 100)	over 100
Respiratory effort	Absent	Slow irregular	Good crying
Muscle tone	Flaccid	Some flexion of extremities	active movements
Reflex response	No response	Grimace	cry
Color	Blue, pale	Body pink extremities blue	Completed pink
Total score-10	**Severe depression 0-3**	**Mild depression 4-7**	**no depression 7-10**

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3. Care of the umbilical cord- In case of normal infant, umbilical cord should be cut tied when it has stooped pulsating. Care must be taken to prevent tetanus of the newborn by using properly sterilized instruments & cord ties. It is essential to apply an antiseptic preparation on the cord stump & the skin around the base. It dries &shrivels up & separates by aseptic necrosis in 5-8 days.

4. Care of the eyes- Before the eyes are open, the lid margins of the newborn should be cleaned with sterile wet swabs.

5. Care of the skin- When a baby a few hours old, the first bath is given with soap & and warm water to remove vernix, meconium & blood clots. Some prefer to apply warm oil before bath.

6. Maintenance of body temperature- The normal body temperature of newborn is between 36.5-37.5 degree Celsius.

7. Breast feeding- Breast feeding should be initiated within an hour of birth instead of waiting several hours as is often customary. Although there is little milk at time, it helps to establish feeding & a close mother – child relationship, know as bonding. The first milk which is called "colostrum" is the most suitable food for the baby during this early period because it contains a high concentration of protein & other nutrients

It is the ideal food for the infant. No other food is required by baby until 6 months after birth. Normal condition Indian mother secrete 450-600 ml of milk daily with 1.1 gm protein per 100 ml. The energy value of human milk is 70 kcal per 100 ml.

Advantages

1. It is safe, clean, hygienic, cheap, & available to infant at correct temp.
2. It fully meets the nutritional requirement of infant in the first few months.
3. It contains antimicrobial factors such as macrophages, lymphocytes, secretary IgA, anti-streptococcal factor, lysozyme, lactoferrin which provide protection not only diarrheal other diseases also like RTI, enterocolitis.
4. It is easily digested & utilized by both normal & premature babies.
5. It promotes bonding between the mother & infant.
6. It protects babies from the tendency to obesity.
7. Sucking is good for baby it helps in the development of jaw &teeth.
8. It prevents malnutrition & reduces infant mortality.
9. It prevents neonatal hypocalcaemia & hypomagnesaemia.
10. It helps parents to space their children by prolonging the period of infertility.
11. Special fatty acids in breast milk lead to increased intelligence & better visual acuity. A breast fed baby is likely to have an IQ of around 8 points higher than a non- breast fed baby.

Artificial feeding- the main indications for artificial feeding are failure of breast milk, prolonged illness or death of the mother. It is crucial for the baby to fed "breast- milk substitutes"- e.g. dried whole milk powder, fresh milk from a cow or other animal or commercial formulae.

Principles of artificial feeding (Nutritional needs)

1. Infants require an average of 100 kcal of energy per kg of body weight per day.
2. Protein requirement is about 2gm/kg of body weight during the first 6 month. 1.5 gm/kg by the end of one year.
3. Carbohydrate requirement is about 10 gm/kg of body weight daily.
4. After 4 month of age undiluted boiled & cooled milk should be given.
5. Infants need feeding at frequent intervals about 6-8 times a day, older babies 5 times a day.
6. During illness the calories need is increased & it should be met.

Care of The Pre-School Child

- Children between 1-4 years of age generally called pre-school age children.
- Pre-school age children about 12 % of the general population in India. A large majority of

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these children live in rural & tribal areas & urban slums.

- The pre-school age mortality in India is as high as 4.9 % of all deaths. The high mortality which is largely due to infection & malnutrition.
- The prevalence of severe protein energy malnutrition ranged 5-6 % mild protein energy malnutrition about 40%.

School Health Service

The health problem of school children varies one place to another.

Objectives

1. The promotion of positive health.
2. The prevention of disease
3. Early diagnosis, treatment & follow-up of defects
4. Awakening health consciousness in children.
5. The provision of healthful environment.

Aspects of school health service

1. Health appraisal
2. Remedial measures & follow-up
3. Prevention of communicable diseases.
4. Health school environment
5. Nutritional services.
6. First aid & emergency care.
7. Mental health
8. Eye health
9. Dental health
10. Health education
11. Education of handicapped children.
12. Proper maintenance & use of school health records.

Child Health Problems

The problem facing the health worker in the developing world are vast & are nowhere more evident than in the field of childcare.

1. Low birth weight
2. Malnutrition
3. Infections & parasitosis
4. Accidents & poisoning
5. Behavioural problems.

Low birth weight

- The birth weight of infant is single most important determinant of its chance of survival, healthy growth & development.
- There are two main group of low weight babies- those born prematurely (short gestation) & those with fetal growth retardation.
- A target birth weight of at least 2.5 kg for 90 % of newborn infants, & an adequate growth of children as measured by weight-for-age, together constituted global indicator number "8" for monitoring & evolution of the global strategy for health for all /2000.
- By international agreement low birth weight has been defined as a birth weight of less than 2.5 kg the measurement being taken preferably within the first hour of life.
- WHO estimates that globally about 25 million low birth weight babies are born each year.
- Infants who weigh less than 2.5 kg at birth represent about 28 % of all live birth in India. In India mean birth weight is between 2.7 to 2.9 kg.

Malnutrition

- It is most widespread condition affecting the health of children. Unsuitable foods, lack of purchasing power of family as well as traditional belief & don't know what the baby should eat, often lead to an insufficient balanced diet, resulting malnutrition.
- In India the national family health survey included survey of nutritional status of young children both chronic & acute under nutrition were found to high in all the 7 states.
- Namely Haryana, Karnataka, Maharashtra, Orissa, Tamilnadu, Uttar Pradesh& Goa.
- At present in India 65% children under 5 years age are underweight. This includes 43% moderate to severe cases, 16 % severe malnutrition.
- Malnutrition makes the child more susceptible to infection recovery is slower & mortality is higher.

Infectious & parasitic diseases- Young

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children fall an easy prey to infectious diseases. The leading childhood diseases are- diarrhea, respiratory infections, measles, pertussis, polio, neonatal tetanus, tuberculosis & diphtheria.

Accidents & poisoning- In the developed world, accidents & poisoning have become a relatively more important child health problem. Accidents among children are frequent in the developing countries also, especially burns, trauma, poisoning as a result of home accidents to in increasing degree, drowning, traffic accidents.

Behavioural problem-

- Behavioural disturbances are notable child health problem, the importance of which is increasing recognized in most countries.
- The international union for child welfare has estimated that there are 1.5 million such children in India alone.

Indicators of Mch Care

1. Maternal mortality rate-

$$= \frac{\text{Total no. of female death due to complication of Pregnancy, childbirth or within 42 days of delivery from "puerperal causes" in an area during a given year}}{\text{Total no. of live births in the same area and year}} \times 1000$$

2. Mortality in infancy & childhood-

a. Perinatal mortality rate

$$= \frac{\text{Late foetal death (28 weeks gestation \& more) + early neonatal deaths (first week) in one year}}{\text{Live birth in the same year}} \times 1000$$

b. Neonatal mortality rate

$$= \frac{\text{Number of death of children under 28 days of age in year}}{\text{Live birth in the same year}} \times 1000$$

c. Post-neonatal mortality rate

$$= \frac{\text{No. of deaths of infants (children) between 29 days and one year of age in a given year}}{\text{Total no. of livebirths in the same year}} \times 1000$$

d. Infant mortality rate

$$= \frac{\text{No. of deaths of infants, in a given area during a given year}}{\text{Total no. of livebirths in the same year}} \times 1000$$

e. 1-4 year mortality rate

$$= \frac{\text{No. of deaths of children between 1–4 yrs of age in a given area, during a given year}}{\text{MYP of children between 1–4 yrs of age}} \times 1000$$

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f. **Child survival rate**

$$= \frac{1000 - \text{Under 5 mortality rate}}{10}$$

MCQ on Mother and Child Health Care

1. To impart health education regarding child care to large number of mothers visiting MCH centre it is decided to resort to method of group discussions. What could be appropriate strength of each group for this purpose?
   a) 3-5 b) 4-6
   c) 6-12 d) 20-25
2. Health education is the responsibility of
   a) Health educationalist
   b) Doctor
   c) Paramedical staff
   d) Community Nurse
3. Diarrhoeal cases among children of an urban slum are on a rise. Almost all the mothers are illiterate and belong to lower socioeconomic class. It seems difficult to make them understand the use of ORS. What method can provide the best solution in this scenario?
   a) Role playing
   b) Poster competition
   c) Radio Programme
   d) Lectures
4. A pregnant woman presented with pallor, shortness of breath, lethargy and palpitation. Her blood examination revealed haemoglobin level of 9 gm/dl. In your opinion what could be the probable deficiency in the woman?
   a) Iron b) Niacin
   c) Vitamin C d) Iodine
5. Which one of the following is not included in the four pillars of safe mother hood?
   a) Family planning b) Antenatal care
   c) Clean delivery d) Female literacy
6. The average weight gain for a pregnant woman with BMI 20 – 25 should be
   a) 4 to 8kg b) 8 to 12kg
   c) 12 to 16kg d) 16 to 20 kg
7. EDD is calculated by:
   a) LMP + 9 months
   b) LMP + 9 months +7 days
   c) LMP + 9 months +7 weeks
   d) LMP + 9 months + 10days
8. Number of antenatal visits should be atleast
   a) 5 b) 3
   c) 4 d) 2
9. The first foetal motion felt by the mother is known as
   a) Chadwick sign b) Osiender sigh
   c) Quickening d) Goodle sign
10. Women creating most comfortable atmosphere for her future t birth can be sign of I
    a) Cervical Ripening
    b) Dropping
    c) Braxton Hicks Contraction
    d) Nesting Syndrome
11. What is mean by Sheehan's syndrome
    a) Decreased function of pituitary gland
    b) Decreased function of hypothalamus
    c) Increase function of thyroid gland
    d) Increase function of adrenal gland
12. For management of PPH, how much ml of saline is inflated into procedure?
    a) 300-500ml b) 200-300ml
    c) 300-600ml d) 100-300ml
13. Anemia during pregnancy is confirmed when hemoglobin level
    a) 11g/dl b) 10g/dl
    c) 13gg/dl d) 12g/dl
14. IFA full form
    a) Intra folicular assay
    b) Interfuse acid
    c) Insulin Fusiform Amino
    d) Iron Folic acid
15. Labour is said to be normal when
    a) Onset is spontaneous.
    b) Foetus presents by vertex.
    c) Completed without undue prolongation
    d) All of the above

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16. Active stage of labour is characterized by:
    a) Cervix is dilated >4 cm
    b) Cervix is dilated <4 cm
    c) 2 contractions in 10minutes
    d) Cervix is dilated =4 cm

Answers MCQ on Mother and Child Health Care

1. Ans. c) 6-12
2. Ans. d) Community Nurse
3. Ans. a) Role playing
4. Ans. a) Iron
5. Ans. d) Female literacy
6. Ans. b) 8 to 12kg
7. Ans. b) LMP + 9 months +7 days
8. Ans. c) 4
9. Ans. c) Quickening
10. Ans. d) Nesting Syndrome
11. Ans. a) Decreased function of pituitary gland
12. Ans. a) 300-500ml
13. Ans. a) 11g/dl
14. Ans. d) Iron Folic acid
15. Ans. d) All of the above
16. Ans. a) Cervix is dilated >4 cm

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Chapter 19

Family Welfare Programme

Syllabus

Definition of Demography and sources of demographic statistics in India. Demographic cycle & definition of life expectancy. Definition of family planning, eligible couple and target couple. Objectives of family planning. Problems of population explosion. National population policy. Methods of Contraceptive (Fertility Regulating Methods).

Learning objectives

1. Define demography and enlist the sources of demographic statistics in India.
2. Describe the demographic cycle & define life expectancy.
3. Define family planning, eligible couple and target couple. Enlist & explain the objectives of family planning
4. Explain the problems of population explosion and describe national population policy.
5. Classify and describe the Contraceptive methods (Fertility Regulating Methods).

Total - 4 hours (Lecture :2 hour, Non-lecture: 2 hours)
MCQ- Yes- SAQ (5 Marks)- Yes- LAQ (10 Marks)- No

India launched the National Family Welfare Programme in 1951 with the objective of reducing the birth rate to the extent necessary to stabilize the population at a level consistent with the requirement of the National economy. The Family Welfare Programme in India is recognized as a priority area, and is being implemented as a 100% centrally sponsored programme.

Demography- Is the scientific study of human population; It focuses attention on.

1. Changes in population size (growth or decline)
2. Composition of population
3. Distribution of population in space

It deals with five "demographic processes", namely fertility mortality, marriage, migration and social mobility. These five processes are continuously at work within a population determining size, composition and distribution.

Demographic Cycle- There are five stages in the demographic cycle.

1. **First stage-(high stationary stage)-** High birth rate and high death rate, where population is stationary. India during 1920.
2. **Second stage (early expanding)-** The death rate begins to decline and birth rate remains same e.g. many countries in south Asia and Africa.
3. **Third stage (late expanding)-** The death rate decreases further, with the decreasing birth rate. Birth exceeds death e.g. developing countries like India, china etc.
4. **Fourth stage (low stationary)-** Stage with low birth rate and low death rate resulting in stationary e.g. Denmark, Australia.
5. **Fifth stage (declining stage)-** The population starts to decline because lower birth rate than the death rate e.g. Germany, Hungary.

Census- Census is defined as the simultaneous recording of demographic, social and economic data of individuals of a country on a specified day. The data are complied, analyzed and published. Demographic data include age, sex, place of birth,

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literacy, and technical and postgraduate qualifications.

Life expectancy or exception of life- at a given age is the average number of years which a person of that age may expect to live, according to the mortality pattern prevalent in that country. Life expectancy at birth has continued to increase globally over the years. For 1950-1955, the combined life expectancy at birth for both sexes was 46.5 years. The increase has been more marked in less developed regions of the world than in the developed regions.

Demographic indicators

Demographic characteristics provide an overview of its population size, composition, territorial distribution, changes therein and the components of changes such as nativity, mortality and social mobility. Demographic indicators have been divided into two parts – population statistics and vital statistics.

Population statistics include indicators that measure the population size, sex ratio, density and dependency ratio. Vital statistics include indicators such as birth rate, death rate, natural growth rate, life expectancy at birth, mortality and fertility rates.

These indicators help in identifying areas that need policy and programmed interventions, setting near and far-term goals and deciding priorities, besides understanding them in an integrated structure. With a population of 1,364 million in the year 2014, India is the second most populous country in the world, next only to China, whereas seventh in land area. With only 2.4 per cent of the world's land area, India is supporting about 17.5 per cent of the world's population.

Some of the factors which have engaged attention of demographers since long are discussed below.

1. **Age at marriage**
2. **Duration of married life**
3. **Spacing of children**
4. **Education**
5. **Economic status**
6. **Caste and religion**
7. **Nutrition**
8. **Family planning**
9. **Other factors** - Fertility is affected by a number of physical, biological, social and cultural factors such as place of women in society, value of children in society, widow remarriage, breastfeeding, customs and beliefs, industrialization and urbanization, better health conditions, housing, opportunities for women and local community involvement.

Family Planning

Definition-An expert committee of WHO defined family planning as "a way of thinking & living that is adopted voluntarily, upon the basis of knowledge, attitudes & responsible decisions by individuals & couples, in order to promote the health & welfare of the family group & thus contribute effectively to the social development of a country."

Objectives-

1. To avoid unwanted births
2. To bring about wanted births
3. To regulate the interval between pregnancies
4. To control the time at which births occur in relation to the ages of the parent.
5. To determine the number of children in the family.

Ideal contraceptive- Ideal contraceptive is safe, effective, acceptable, inexpensive, reversible, simple to administer, independent of coitus, long lasting enough to obviate frequent administration & requiring little or no medical supervision.

Eligible couples- An "eligible couple" refers to a currently married couple wherein the wife is in the reproductive age, which is generally assumed to lie between the ages of 15 and 45. There will be at least 150-180 such couples per 1000 population in India.

Target couples-The term target couple was applied to couples who have had 2-3 living children, and family planning was largely directed to such couples.

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Health aspect of family planning- WHO scientific group on the health aspects family planning. These can be summarized under the following headings-

1. Women's health
2. Foetal health
3. Child health

Women's health- Maternal mortality, morbidity of women of child bearing age, nutritional status, preventable complication of pregnancy and abortion. Pregnancy can mean serious problem for many women. It may damage the mother's health or even endanger her life. In many developing countries the risk of dying as a result of pregnancy is 10-20 times greater than in developed countries. The risk increases as the mother grows older and after she has had 3 to 4 children.

Foetal health- A number of congenital anomalies are associated with advancing maternal age. Such congenital anomalies can be avoided by timing the births in relation to the mother's age. Further, the quality of population can be improved only by avoiding completely unwanted births.

Child health- Child mortality- it is well known that child mortality increases when pregnancies occur in rapid succession. A birth interval of 2 to 3 years is considered desirable to reduce child mortality.

Child growth development and nutrition – birth spacing and family size are important factors in child growth and development.

Infectious diseases- Child living in large- sized families has an increase in infection, especially infectious gastroenteritis, respiratory and skin infections.

Small family norm- The objective of the family welfare programme in India is people should adopt the "small –family norm". In 1970 the slogan was the famous "Do Ya Teen Bas". In view the seriousness not situation. In 1980 campaign has advocated by 2 child norm. The current emphasis is on three themes-

"Son or daughter two will do",
"Second child after 3 years" and
"Universal Immunization".

Problems of Population Explosion

An increase in the population in an area from one year to another year is called 'Population growth', which is expressed as 'Annual growth rate'. Growth rate is computed by subtracting crude death rate from crude birth rate. But in reality GR = (CBR - CDR) + Immigration - emigration).

The current GR in India = 20.97 - 7.48 = 13.49 per 1000 MYP = 1.35 percent. The difference between the Birth rate and Death rate in a graph is marked as 'Demographic gap'.

As long as the natural resources of a country (such as water, soil, minerals, forests) are able to support and sustain the population by providing basic needs, such as food, cloth and shelter, so long, the increase in population is called as 'Population growth'.

But when the growth of the population is so much that the natural resources are unable to support and provide the basic needs, it is described as 'Population explosion' or 'Population Bomb'. It is a sad state of affairs.

Grading of the population increase as per the growth rate

Growth rate (%)	Grading of population increase
'0' (Zero)	Stationary growth (No growth)
0 to 0.5	Slow growth
0.5 to 1	Moderate growth
1 to 1.5	Rapid growth
1.5 to 2.0	Very rapid growth
> 2	'Explosive' growth (Population explosion)

It is said that population growth rate, like a railway train, is subjected to momentum. It starts slowly and gains momentum. Once it is in full speed, takes a long time to bring the momentum under control. The controlling factors for growth rate is mainly the birth-rate and the related factors.

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The world population is currently growing at the rate of 3 per second, 180 per minute, 10,800 per hour, 2,59,200 per day and 9.2 crores per year. As the growth rate increases, the doubling time becomes shorter. In India, during 20th century, first doubling occurred in 60 years and second doubling occurred within just 30 years.

Reasons for Population Explosion

- High birth rate
- Low death rate.

Hazards of Population Explosion

- **Physical hazards**
  1. Housing (Eruption of slums with poor living conditions)
  2. Environmental pollution (Air, soil, water, etc.)
  3. Vector problems.
- **Psychological hazards**
  1. Behavioral disorders.
  2. Mental illness (Neuroses and psychoses)
  3. Anxiety (Due to stress and strain)
  4. Tension, worries.
- **Social hazards**
  1. Alcoholism
  2. Broken homes
  3. Corruption
  4. Divorces
  5. Drug abuse
  6. Gambling, Unemployment problem.
- **Antisocial activities-** Theft, murder, sex-crimes (rape, prostitution), robbery, child abuse, juvenile delinquency.
- **Miscellaneous hazards**
  1. Malnutrition
  2. Infections
  3. STDs including AIDS
  4. Accidents
  5. Epidemics
  6. Hypertension due to stress and strain, etc.

National Population Policy

Goal: The attainment of the highest possible level of good health and well-being, through a preventive and promotive health care orientation in all developmental policies, and universal access to good quality health care services without anyone having to face financial hardship as a consequence.

Objectives of National Population Policy 2000

1. Immediate objectives: To meet unmet need of contraception; to strengthen health infrastructure; to strengthen health personnel and to promote integrated service delivery for basic RCH care
2. Mid-term objective: 'To bring the total fertility rate (TFR) to Replacement Level; i.e. TFR to 2.1'
3. Long-term objective: To stabilize population by 2045

National Socio-demographic Goals of NPP 2000 (achieve by 2010)

1. Address the unmet needs for basic reproductive and child health services, supplies and infrastructure
2. Make school education up to age 14 free and compulsory, and reduce drop outs at primary and secondary school levels to below 20 percent for both boys and girls
3. Reduce infant mortality rate to below 30 per 1000 live births
4. Reduce maternal mortality ratio to below 100 per 100,000 live births
5. Achieve universal (100%) immunization of children against all vaccine preventable diseases
6. Promote delayed marriage for girls, not earlier than age 18 and preferably after 20 years of age
7. Achieve 80 percent institutional deliveries and 100 percent deliveries by trained persons
8. Achieve universal access to information/ counseling, and services for fertility regulation and contraception with a wide basket of choices
9. Achieve 100 percent registration of births, deaths, marriage and pregnancy

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10. Contain the spread of Acquired Immuno-deficiency Syndrome (AIDS), and promote greater integration between the management of reproductive tract infections (RTI) and sexually transmitted infections (STI) and the National AIDS Control Organisation
11. Prevent and control communicable diseases
12. Integrate Indian Systems of Medicine (ISM) in the provision of reproductive and child health services, and in reaching out to households
13. Promote vigorously the small family norm to achieve replacement levels of TFR
14. Bring about convergence in implementation of related social sector programs so that family welfare becomes a people centred programme

Contraceptive Methods/fertility Regulating Methods/methods of Family Planning

Contraceptive methods are, by definition, preventive methods to help women avoid unwanted pregnancies. They include all temporary and permanent measures to prevent pregnancy resulting from coitus.

Temporary Method

Spacing method :

1. Barrier methods
   a. Physical methods
   b. Chemical methods
   c. Combined methods
2. Intra-uterine devices
   a. Medicated
   b. Non-Medicated
3. Hormonal methods
   - Oral pills
     a. Combined pill
     b. Progestogen only pill (POP)
     c. Post-coital pill
     d. Once-a-month (long acting) pill
     e. Male pill
   - Depot (slow release) formulation
     a. Inject able
     b. Subcutaneous implants
     c. Vaginal rings
4. Post conceptional methods
5. Miscellaneous
   a. Abstinence
   b. Coitus interrupts
   c. Safe period
   d. Natural family planning methods
   e. Breast feeding
   f. Birth control vaccine

Terminal Methods

1. Male sterilization
2. Female sterilization

1. Barrier Methods- A variety of barrier or "occlusive" methods, suitable for both men and women are available. The aim of these methods is to prevent live sperm from meeting the ovum. Barrier methods have increased in popularity quite recently because of certain contraceptive and non-contraceptive advantages. The main contraceptive advantage is the absence of side effects associated with the pill and IUD. The contraceptive advantage includes some protection from sexually transmitted diseases, a reduction in the incidence of pelvic inflammatory disease and possibly some protection from the risk of cervical cancer.

a. Physical methods-

1. Condom-

Method- Spacing, physical barrier method

Device- Thin latex (rubber sheath) device

Mechanism of action- Prevents the semen being deposited in vagina

Eligible candidate- All men

Instruction to us-

i. Use new condom for each act.
ii. Fitted by unrolling on erect penis
iii. Proper care is taken during use

Advantage-

i. Easy to use
ii. Safe and inexpensive
iii. Easily available
iv. No side effects
v. Provides protection not only against pregnancy but also against STD.

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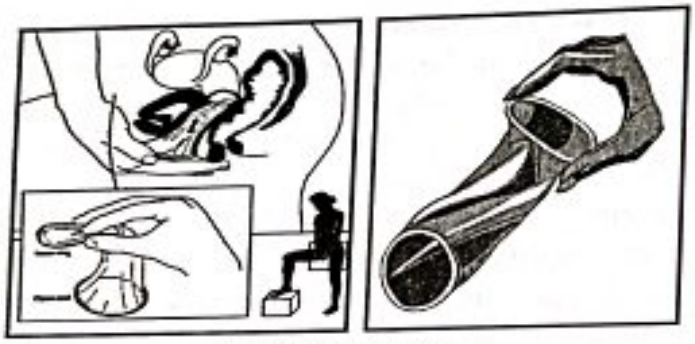
Disadvantage- decreases the sex sensation and it may slip off or tear during coitus due to incorrect use.

Failure rate- 12-14 per hundred women years of exposure.

Condoms are manufactured in India by Hindustan Latex in Trivandrum, London Rubber industries in Chennai and others.

1. Female Condom

Method- Spacing, physical barrier/ conventional



FEMALE CONDOM

Device- Soft, thin, transparent pouch

- Made of polyurethane plastic, latex
- Pre-lubrication with silicon
- Condom fits loosely inside the vagina
- It has flexible rings at both ends
- Internal ring is small and anchors the cervix
- Outer ring is large and stays outside

Mechanism of action- forms a barrier, prevent semen being deposited in vagina.

Eligible candidate- all women

Instruction to use- use just before and removed soon after sex

- Outer ring should remain outside the vagina
- Ensure that penis enters inside the condom
- Remove the condom by holding outer ring and twisting.
- Male and female condom should not be used together.

Advantage- Easy to use in first experience itself

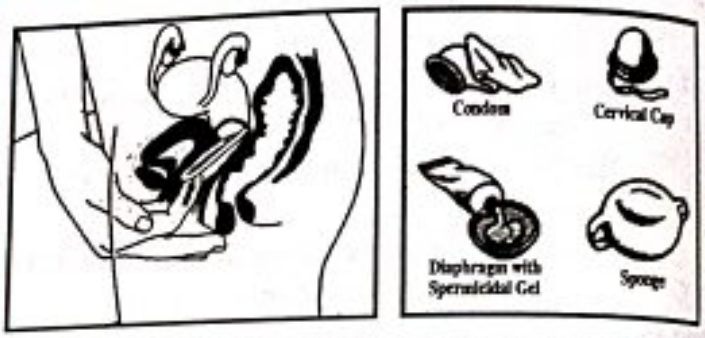
Disadvantage- costly, high failure rate

Side effects- mild irritation and latex allergy

Additional benefits- protects from HIV and STD

Failure rate- 20-25 per hundred women- years of exposure

2. Diaphragm



Condom, Cervical Cap, Diaphragm with Spermicidal Gel, Sponge

Method- Spacing, physical barrier/ conventional

The diaphragm is vaginal barrier. It was invented by German physician in 1882. Also known as "Dutch cap".

Device-The diaphragm is shallow cup made of synthetic rubber or plastic material.It ranges in diameter from 5-10 cm. It has flexible rim made of spring of metal.

Instruction to use- It is important that a woman be fitted with a diaphragm of the spring tension and partly by the vaginal muscle tone.

This means for successful use the vaginal tone must be responsible.

Diaphragm is inserted before sexual intercourse and must remain in place for not less than 6 hours after sexual intercourse.

A spermicidal jelly is always used along with the diaphragm.

Advantage- The primary advantage of the diaphragm is the almost total absence of risks and medical contraindication.

Disadvantage- initially physician or other trained person will be needed to demonstrate the technique of inserting the diaphragm into the vagina and to ensure a proper fit.

Diaphragm is left in the vagina for an extended period; there is a remote possibility of a toxic shock syndrome.

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Side effects- practically nil.

Failure rate – 6-12 per 100 women years.

Variation of diaphragm includes the cervical cap, vault cap and vimule cap.

These devices are not recommended in the family national welfare programme.

3. Vaginal Sponge

Method- Spacing, physical barrier/ conventional

Device- Another barrier device employed for hundreds of years are the sponge soaked in vinegar and olive oil, but it is only recently one has been commercially marketed in USA under the trade name 'TODAY'.

It is a small polyurethane foam sponge measuring 5cm X 2.5 cm. saturated with spermicidal.

Advantage- the sponge is for less effective than the diaphragm but is better than nothing.

Failure rate- Parous women is 20-40 percentages. Nulliparous women about 9-20 % per years.

Chemical Methods

In the 1960 before the advent of IUD's and oral contraceptives, spermicidal (vaginal chemical contraceptive) were used widely.

a. Foams- foam tablets, foam, aerosols.
b. Crams, jellies and pastes- squeezed from a tube.
c. Suppositories- inserted manually
d. Soluble films- C-shape film inserted manually

The commonly used almost modern spermicidal are "surface –active agents" which attack themselves to spermatozoa and inhibit oxygen uptake and kill sperms.

Drawback-

1. They have a high failure rate
2. They must be used almost immediately before intercourse and repeated before each sex act.
3. They must be introduced into those regions of the vagina where sperms are likely to be deposit.
4. They may cause mild burning or irritation besides, messiness.

The spermicidal should be free from potential systemic toxicity. It should not have an inflammatory or carcinogenic effect on the vaginal skin or cervix.

It is really effective preventing pregnancy when used alone. Spermicidal are not recommended by professional advisers. They are best used in conjunction with barrier methods.

Intra-Uterine Devices-

Types of IUD-

Two types of IUD

1. Non-medicated 2. Medicated

Both are usually made of polyethylene or other polymers. Medicated or bioactive IUDs release either metal ions (copper) or hormones (progestogens).

The non-medicated or insert IUDs are often referred to as first generation IUDs. The copper IUDs comprise the second and the hormone releasing IUDs the third generation IUDs.

The medicated IUDs were developed to reduce the incidence of side effects and to increase the contraceptive effectiveness.

In India, under the National Family welfare programme, Cu-T 200B is being used from 2002. Cu-T 380A has been introduced in the programme.

First generation IUDs

The first generation IUDs comprise the insert or non-medicated devices, usually made of polyethylene or the polymers.

They appeared in different shape and sizes loops, spirals, coils, rings and bows of all the metals, the lippes loop is the best known and commonly used device in developing countries.

Lippes loop

Device-It is double –S shaped device made of polyethylene, a plastic material that isnon-toxic, non tissue reactive and extremely durable.

Contains- Made of polyethylene, a plastic

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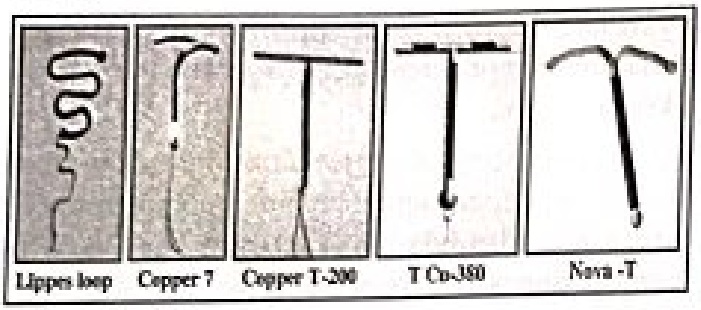
material. Small amount of barium sulphate to allow X-ray observation.



Instruction for uses- The loop has attached thread or "tail" made of fine nylon, which project into the vagina after insertion. The tail can easily felt and is a reassurance to the user that the loop is in its place. The tail also makes it easy to remove the loop when desired.

Size- The lippes loop in four sizes A, B, C and D the latter being the largest.

Side effects- pain and bleeding. The larger are more suitable for multi parous women.

Second Generation IUDs-A new approach was tried in the 1970 by adding copper to IUD. It was found that metallic copper has a strong anti-fertility effect. The addition of copper has made it possible to develop smaller devices are easier to fit, even in nulliparous women.

Earlier devices- Copper- 7

Copper T-200

Newer devices- Various of the T devices -TCu-220C, T Cu-380 A or Ag, Nova T

Multi load devices ML-Cu250, ML-Cu-375

The number included in the names of the devices refer to the surface area of the copper on the device Nova-T and T Cu-380Ag are distinguished by silver core over which is wrapped the copper wire.

The newer copper IUDs multi load device and variants of the T device after the further advantage of having an effective life of at least 5 years.

Advantages-

1. Low expulsion rate
2. Lower incidence of side effects, e.g. pain and bleeding
3. Easier to fit even in nulliparous women
4. Better tolerated by nulliparous
5. Increased contraceptive effectiveness
6. Effective as post coital contraceptives, if inserted within 3-5 days of unprotected intercourse.

Third Generation IUDs- Based on still another principles i.e. release of a hormone. Most commonly used device is progestacert, the hormone is released slowly in the uterus at the rate of 65 mcg daily. IUds releasing levinogestrel is also found.

Advantage- Lower menstrual blood loss and fewer days of bleeding compared to copper T devices.

Disadvantage- costly

Mode of action-

1. Increase viscosity of cervical mucus; there by prevent sperm from emerging cervix.
2. High levels of progesterone in endometrium and relatively low levels of oestrogen make endometrium unfavorable for implantation.

Effectiveness – The IUD is one the effective reversible contraceptive methods. The "theoretical effectiveness" of IUD is less than that of oral and injectable hormone contraceptive.

Change of IUDs- insert IUDs such as lippes loop may be less in place as long as required if there are no side effects.

T Cu-380A-10 years

T Cu-200- 4 years

Nova T- 5 years

Progeasterone releasing IUD- every year

Levonogestrel IUD- 7 years

Advantages of IUDs-

1. Simplicity i.e. no complex procedures are involved in insertion, no hospitalization is required.
2. Insertion takes only a few minutes
3. Once inserted IUD stays in place as long as required
4. Enexpensive

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5. Contraceptive effect is reversible by removal of IUD.
6. Virtually free of systemic metabolic side effects associated with hormonal pills.
7. Highest continuation rate.
8. There is no need for the continual motivation required to take a pill daily or to use a barrier methods consistently. Only a single act of motivation is required.

Contraindication-

1. Suspected pregnancy
2. Pelvic inflammatory diseases
3. Vaginal bleeding of undiagnosed etiology
4. Cancer of cervix, uterus and other pelvic tumors
5. Purulent cervical discharge
6. Deformation of the uterine cavity due to congenital malformations.
7. Unmotivated person

The ideal IUD candidate-

1. Who has borne at least one child
2. Has no history of pelvic diseases
3. Has normal menstrual periods
4. willing to check the IUD tail
5. Has access to follow-up and treatment of potential problem
6. Is a monogamous relationship.

Timing of insertion of IUD-The most propitious for insertion of a menstrual or within 10 days of beginning of menstrual periods.

Side - effects and complication-

Bleeding, pain, pelvic infection, uterine perforation, pregnancy, ectopic pregnancy, expulsion, fertility after removal cancer and teratogenesis, morality (one death per 1,00,000).

Copper T

Method-Spacing, second generation intra-uterine device

Device- small, flexible plastic frame of silver core, wrapped with copper wire(TCu-380A)

Mechanism of action- by foreign body reaction, it alters the bio-chemical change in the uterus, disturb sperm and egg union and implantation.

Eligible candidate-all women of reproductive life Not a method of choice for nulliparous

Insertion-

- Within 10 day of menstrual bleeding
- Within 5 day after unprotected sex
- Within 48 hours after delivery
- 6-8 week after delivery
- 12 week after delivery

Insertion into uterus by trained person after pregnancy is ruled out

Instruction- check the string regularly

Follow up visit one month after insertion and once a year afterwards

Advantage-

- Simple insertion effects, low risk,
- Long time protection (10 year)
- No continued motivation is needed
- Can be used within three to five day as post coital contraceptive
- No interruption in the sex

Disadvantage- needs trained person for insertion, periodic replacement, needs yearly follow up.

Side effects- irregular bleeding, expulsion, pain, backache during monthly bleeding, perforation, infection, pelvic infection and inflammatory disease, anemia, ectopic pregnancy.

Additional benefits (non- contraceptive benefits)- Prevent endometrial cancer.

Contraindication- Suspected pregnancy, Nulliparous and women having multiple partners, Anemia, abnormal bleeding, Pelvic inflammatory diseases, cervix, uterus and ovarian cancer, HIV without treatment, systemic lupus erythematosus (SLE)- severe thrombocytopenia. Previous ectopic pregnancy, congenital uterine malformation.

Effective failure- 1.5 per hundred women-years of exposure up to 10 year.

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Hormonal Contraceptive Methods

Hormonal contraceptive used as most effective spacing method of contraception.

Oral contraceptives of the combined type are almost 100% effective in preventing pregnancy. More than 65 million in the world are estimated to take the 'pill'.

Classification

1. **Oral pills**
   a. Combined pill
   b. Progestogen only pill (POP)
   c. Post-coital pill
   d. Once-a-month (long acting) pill
   e. Male pill
2. **Depot (slow release) formulation**
   a. Inject able
   b. Subcutaneous implants
   c. Vaginal rings

1. Oral Pills-

a. Combined Oral Pill

Method- spacing, low dose hormonal contraceptive

Device- blister pack contains 21 hormonal pills and 7 IFA tablets. Each hormonal pill.

Contains –progestin: Norgestrel 0.3 mg
Estrogen : ethniyl estradiol 0.03 mg

Mechanism of action- by inhibiting ovulation. Prevents sperm entry by making cervical secretion thick

Eligible candidate- any women after screening

Instruction to use-

1. Consultation and screening before starting
2. New pack for each cycle staring at 5th day
3. Take one tablet orally every day, at fixed time
4. Any missed pill should be taken as soon as possible periodic follow up.

Advantage

1. Easy to use, effective and cheap
2. Controlled by women herself
3. Can be stared at any time except pregnancy and stopped at any time
4. Reversible and does not interfere with sex
5. Available under social marketing and free distribution.
6. HIV infected women on antiretroviral therapy (ART) can use oral contraceptive pills (OCP) along with condom for additional protection.

Disadvantage- adverse effects on lactation, long term use may cause non-communicable diseases.

Side effects- Breast tenderness, Weight gain, disturbance in serum lipid, Mood changes, Deep vein thrombosis, Cervical cancer

Contraindication- age more than 40 year, Breast feeding mother, Breast cancer, Treatment on anticonvulsants or rifampicin, Hyperlipidemia, Hypertension, diabetes, cardiac problem, stroke, Active liver/ gall bladder diseases, Thrombo-phebitus

Additional benefits- Non contraceptive benefits. Endometrial and ovarian cancer, Anemia, Pelvic inflammatory diseases, Benign breast disorders, Ovarian cysts, Ectopic pregnancy, Ovarian cancer

Failure rate- less than 1 per hundred women years of exposure

Brand name- Mala-D Mala-N

b. Progestogen - Only-pill (POP)

Method- spacing, low dose hormonal contraceptive

This pill is commonly referred to as "mini pill" or "micro pill".

Contains-Only progestogen which is given in small doses throughout the cycle.

Mechanism of action-It works by thickening the cervical mucus, which acts as a barrier to stop sperm entering the womb. It also makes the lining of the womb thinner, to prevent it accepting a fertilized egg.

Advantage-This type of pill is good for women who are breast-feeding, older women, smokers and others who cannot use the combined pill.

It can also help with pre-menstrual syndrome (PMS) and painful periods.

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The pill does not interfere with the spontaneity of sex.

Instruction to use-It must be taken at the same time each day or at most within three hours of that time.

It will not work if taken over three hours late, or if have vomiting and diarrhea, in these cases extra protection is needed.

Side effects-It can cause irregular bleeding and periods may stop altogether while are taking it.

Effectiveness- 98% if taken correctly.

c. Post-Coital Contraception/emergency Contraception-This is NOT a regular method of birth control and should never be used as one.

Emergency contraception, or emergency birth control, is used to keep a woman from getting pregnant when she has had unprotected vaginal intercourse.

Unprotected can mean that no method of birth control was used.

It can also mean that a birth control method was used but did not work – like a condom breaking or when a woman has forgotten to take her birth control pills.

Two methods are available-

1. Hormonal- Post coital or morning after recommended within 72 hours of unprotected intercourse. Emergency contraception consists of taking two doses of hormonal pills taken 12 hours apart and started within three days after having unprotected sex. The pills are 89% effective at preventing pregnancy.
2. IUD- Another type of emergency contraception is having the Copper T IUD put into your uterus within five days of unprotected sex. This method is 99.9% effective at preventing pregnancy.

d. Once - A - Month Pill (long Acting)- Experiment with Once- A-month oral pill in which Quinestrol a long acting estrogen is given in combination with short acting progestogen have been disappointing

e. Male Pills- The search for male contraceptive begins 1950.

A male pill made of Gossypol a derivation of cotton seed oil has been very much in the news.

It is effective in producing azoospermia or severe oligospermia but as many men be permanently azoospermic after taking 6 month.

Further Gossypol could be toxic.

2. Depot Formulations

It is highly effective reversible, long acting & estrogen free for spacing pregnancies in which a single administration suffices for several month or years cannot be stressed.

Inject able contraceptives -

Two types :

1. Progestogen
2. Newer once a month combined injectable

a. Progestogen-only Injectable

a) DMPA (Depot Medroxy progesterone acetate)
b) NET-EN (Norethisteroneenantate)
c) DMPA-SC

a) DMPA (Depot Medroxy progesterone acetate)

Since 1960

Dose- 150 mg I/M every 3 month

Advantage - it does not effect on lactation

Disadvantage- Increase weight, irregular menstrual bleeding and prolonged infertility.

b) NET-EN (Norethisteroneenantate)

Since 1966

Dose - 200mg I/M every 60 days

Administration - 5th day of menstrual period.

c) DMPA-SC-

Inject under the skin rather than in muscle

Dose - 104 mg S/C every 3 month.

Side effects - DMPA-SC& NET-EN have similar side effects disruptions normal menstrual cycle & unpredicted bleeding.

Advantages-

1. Birth control shot given once every three months to prevent pregnancy
2. 99.7% effective preventing pregnancy
3. No daily pills to remember

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Disadvantages-

1. Extremely irregular menstrual bleeding and spotting for 3-6 months!
2. NO PERIOD after 3-6 months
3. Weight change
4. Breast tenderness & Mood change
5. Does not protect against STDs

b. Sub Dermal Implants- It is known as Norplant for term contraception capsule contain 35 mg of levanogestrel.

Method- spacing hormonal –depot

Device- small flexible, silastic plastic rods having progrgesterone

Mechanism of action- by thickening cervical mucus, it blocks sperm entry and prevents ovulation

Eligible- all women

Implantation- implanted under the skin by minor surgical procedure by trained provider

Inner (medical) side of the upper arm is preferred

Implanted within 7 days of starting of menstrual cycle

Advantage- long lasting- reversible

Disadvantage- not reported

Side effects- menstrual irregulatries, breast tenderness, enlarged ovarian follicles, weight gain.

Contraindication- liver, gall bladder disease, breast cancer, unexplained bleeding

Failure rate- 0.2 per 100 women years of exposure using 3-7 year

c. Vaginal Rings

Method- spacing hormonal

Contains- Flexible contraceptive vaginal ring that contains the hormones estrogen and progesterone. The ring releases a continuous low dose of hormones that stops the ovaries from releasing an egg each month.

Instruction to use-

1. You squeeze the ring between your thumb and index finger and insert it into your vagina.
2. Insert the ring in the vagina and leave it there for three weeks
3. Remove the ring for one-week ring-free period, on the same day of the week at about the same time.
4. During the one-week break, you will usually have your menstrual period.

Advantages- Low Maintenance: One ring every three weeks

Disadvantages- You will need to visit your doctor for a prescription

Does not protect against STDs and HIV

Post- Conceptional Methods/Termination Of Pregnancy - A

Abortion-Termination of pregnancy before the fetus becomes viable (capable of living independently). This has been fixed administratively at 28 weeks when the fetus weight approximately 1000 gm (1 kg).

Two type of abortion-

1. Spontaneous abortion
2. Induced abortion

Spontaneous abortion-occur once every 15 pregnancies. They may be considered "nature's method of birth control"

Induced abortion-it may be legal or illegal.

Medical termination of pregnancy act 1971It is health care measure which helps to reduce maternal morbidity & mortality resulting from illegal abortion.

It is a post- conceptional method of family planning

MTP Act 1971 Rules-

1. The condition under which a pregnancy can be terminated-

a) Medical - pregnancy endanger the mother's life

b) Eugenic - abnormality in fetus.

c) Humanitarian- pregnancy is result of rape.

d) Socio-economic condition- risk of injury to health of the mother

e) Failure of contraceptive devices

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2. The person or persons who can perform abortion –
   - Registered medical practitioner having experience in gynecology & obstetrics.
   - Pregnancy does not exceed 12 weeks.
3. Where abortion can be done- Government hospital or Government approved hospital.

Miscellaneous Methods

1. Abstinence
2. Coitus interrupt us
3. Safe period (Rhythm method)
4. Natural family planning methods
   a) Basal Body Temperature method (BBT)
   b) Cervical mucus method
   c) Symptothermic method
5. Breast feeding
6. Birth control vaccine-

1. Abstinence

- The method of birth control which is completely effective is complete sexual abstinence
- Not having sexual intercourse at any time. Includes vaginal, anal, or oral intercourse
- 100% effective at preventing pregnancy and STDs

Advantages-Free, Safe, You can remain abstinent while on birth control

Disadvantages- If you might have sex with your partner, it is better to plan on using birth control ahead of time

2. Coitus Interruptus

- This is the oldest method of voluntary fertility control.
- It involves no cost or appliances. It continues to be a widely practiced method.
- The male withdraw before ejaculation & there by tries to prevent deposition of semen into vagina, some couples are able to practice this method successfully.
- It is better than using no family planning method at all.
- Effectiveness: Failure rate can be as high as 15% (15 pregnancies per 100 women).

3. Safe Period (Rhythm Method)

- Also known as Calendar method by Ogino (1930)
- This method can be used for patients with regular cycles only.
- This is done depending on the exact knowledge of ovulation day and avoiding intercourse during the days before and after ovulation;

For example in a regular period that occurs every 28 days the exact day of ovulation should be the day 14 so intercourse should be avoided 4-5 days before and after this days.

There are many methods to detect ovulation days;

1. Increase in body temperature by about 0.5 ^{0}C.
2. Change in type cervical mucus.
3. Ovulation kits nowadays are available for detection ovulation day

Draw back-

1. A women's menstrual cycle are not always regular if the cycle are irregular it is difficult to predict the safe period.
2. It is only possible for this method to be used by educated & responsible couples with high degree of motivation & cooperation.
3. Compulsory abstinence of sexual intercourse for nearly one half of every month. What may be called "programmed sex".
4. This method is not applicable during the postnatal period.
5. A high failure rate of 9 per 100 women years.

4. Natural Family Planning Methods-

a. **Basal body temperature method (BBT)-** Result of an increase in Production of progesterone. The rise of temperature in very small 0.3 to 0.5^{0}C. When no ovulation occurs (e.g. as after menarche, during lactation) the body temperature does not rise.

b. **Cervical Mucus Method-** Also known "Billing Method" or "Ovulation Method". This method is based on observation of changes in the characteristics of Cervical mucus, at the time of ovulation cervical mucus becomes watery Clear

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resembling raw egg white, smooth, slippery, profuse. It is recommended that the woman uses a tissue paper to wipe the inside of vagina to assess the quantity and characteristics of mucus.

c. **Symptothermic Method-** This method combines the temperature cervical mucus & Calendar technique for identifying the fertile period. It woman cannot clearly interpret one sign, she can "double check" her interpretation with another therefore this method is more effective than the "Billing Method."

5. Breast Feeding

- Sometimes called LAM (Locational Amenorrhea Method)
- A natural way to prevent pregnancy after giving birth
- Effective, safe, convenient, and free
- Lasts for up to six months after giving birth

6. Birth Control Vaccine

- Vaccine prepared from Beta-sub unit of human chorionic gonadotropin (HCG)
- The vaccine has recently passed an important milestone; it has completed the first leg of phase II efficacy trials.

Terminal Methods

These are the permanent methods. They are also called as 'Sterilization methods'.

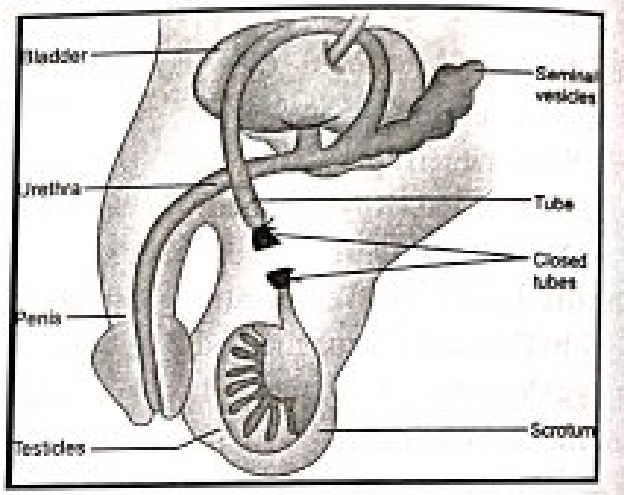
There are two methods-Vasectomy and Tubectomy.

Vasectomy- It is a simple, safe, very effective, cheap, convenient, permanent and quick, surgical method of family planning for men, who decide that they do not want any more children. It is not castration, it does not affect the testes and it does not affect sexual ability.

Procedure- A small incision is made in the scrotum on either side above the testes under local anesthesia, under aseptic precautions, vas-deferens tubes are lifted, cut and tied with thread or clamped and the incisions are closed with stitches. Then bandage is put.

No Scalpel Vasectomy- This is a newer procedure, only one small puncture is made instead of incisions. At the end, it is not sutured, just a bandage is sufficient. It is of shorter duration, less painful and bruising and shorter recovery time.

Both no-scalpel technique and conventional procedures are quick, safe and effective.



Instructions after Surgery

- Rest for two days. He should not do any heavy work or vigorous exercise for a few days.
- The wound should be kept clean and dry.
- If possible put ice on the scrotum for four hours to lessen swelling.
- He should wear snug underwear or pants for two to three days to help.
- He can have sex within 2 or 3 days after the procedure if it is not uncomfortable, but he should use condoms or another effective family planning method for his next 20 ejaculations or three months after the procedure, whichever comes first, because the sperms which are present beyond the site of cut end can result in pregnancy. It requires about 20 ejaculations or about three months for him to become aspermic.

Effectiveness- Vasectomy is highly effective and permanent method. Failure rate is about 0.15 pregnancies per 100 men in the first year after the procedure. It can still be reduced if he uses condom or any other effective method consistently for the first 20 ejaculations or for three months after the procedure, whichever comes first.

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Merits

- It is simple, safe, highly effective, life-long permanent method of family planning.
- Nothing to remember except to use condoms till he becomes aspermic.
- Prolonged sexual pleasure, because no need to worry about pregnancy.
- Compared to tubectomy, vasectomy is easy to perform, more effective, less expensive and able to be tested for effectiveness at any time.
- The surgery can be done even in the clinic.
- Does not require hospitalization.

Demerits

Common short-term surgical complications are:

- Pain in the scrotum, swelling and bruising
- Uncomfortable for 2 to 3 days
- Feeling of faintness after the procedure.

Uncommon complications are:

- Bleeding or infection of the wound
- Blood clots in the scrotum
- Not immediately effective
- It will be effective only when he becomes aspermic.

Tubectomy- This is also known as 'Voluntary surgical contraception', 'Tubal ligation', and 'Minilap'. It is a simple, safe, very effective, cheap, convenient and permanent method of contraception for women, who do not want any more children. It consists of blocking both the fallopian tubes. The procedure is permanent and probably cannot be reversed.

There are two approaches:

1. Minilaparotomy
2. Laparoscopy.

Minilaparotomy (Pomeroy Technique or Interval Procedure)

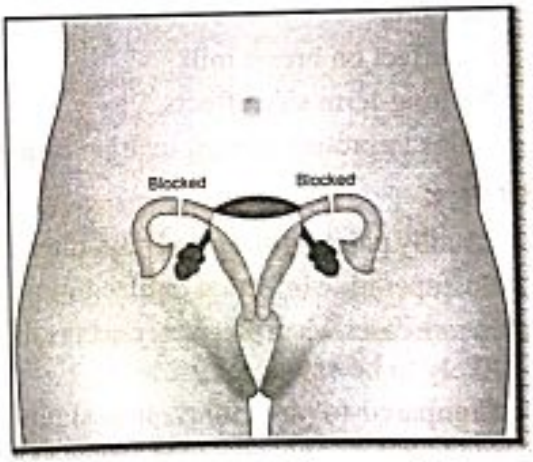
Following thorough physical and pelvic examination of the woman, under the influence of light sedation and local anesthesia, a small incision of 2 to 5 cm is made in the anesthetized area, just above the pubic hair line, under aseptic precautions. The uterus is raised and turned with the elevator to bring each of the fallopian tubes under the incision. Each tube is tied and cut or else closed with a clip or ring. Incision is closed with stitches and bandage is put.

She can leave the hospital in a few hours.

This is more suitable than laproscopy for immediate postpartum period, i.e. six weeks after childbirth.

Laparoscopy Procedure- Following thorough physical and pelvic examinations, the woman is given a light sedation and local anesthesia is given just below the umbilicus. Under aseptic precautions, a special needle is put into her abdomen and inflated with gas or air, so as to raise the wall of the abdomen away from the organs inside.

Then laparoscope is inserted through a small incision of about 2 cm. It is a special, long, thin tube containing lenses as to visualize inside the abdominal cavity and find the fallopian tubes.



Then an instrument is inserted through the laparoscope to close off the tubes with a clip or a ring or by electrocoagulation and then the instrument and the laparoscope are removed, the gas or the air is let out of the abdomen. Then incision is closed with stitches and covered with bandage. She can leave the hospital in a few hours.

Ideally, the operation should be performed within a week of the menstrual period. This confirms the fertility and absence of pregnancy in the woman.

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Instructions after Surgery

- Rest for 2 to 3 days and avoid strenuous work for one week.
- Keep the wound clean and dry.
- Not to have sex for at least one week or until all pain is gone.
- To report at once if she develops, fever, bleeding or pus in the wound.

Effectiveness

Failure rate is about 0.5 pregnancies per 100 women years. Postpartum tubal ligation is one of the most effective female sterilization techniques. In the first year after the procedure 0.05 pregnancies per 100 women.

Merits

- It is simple, safe, very effective, permanent, lifelong method of family planning.
- Nothing to remember (like using condoms unlike in vasectomy).
- No interference with sex; so prolonged sexual pleasure.
- No effect on breast milk.
- No long-term side effects.
- Helps to protect against ovarian cancer.

Demerits

- Usually painful for several days after surgery.
- Postoperative infection or bleeding.
- In rare cases when pregnancy occurs, it is more likely to be ectopic.
- Compared to vasectomy, it is slightly more risky and expensive.
- Reversal surgery is probably not possible.
- Does not protect against STDs including HIV/ AIDS.

Pearl Index (PI)

PI or Pearl rate: MC technique used in clinical trials for measuring the effectiveness of a birth control method. PI is no. of failures per 100 woman years (HWY) of exposure.

$$\text{Pearls Index (PI)} = \frac{\text{Total accidental pregnancy}}{\text{Total months of exposure}} \times 1200$$

Contraceptive Method	Pearl Index (per HWY)
No method used	80
Rhythm (calendar) Method	24
Coitus interruptus	18
Male condoms	2-14
Female condoms	5 - 21
Vaginal sponge Parous women Nulliparous women	20 - 40 9 - 20
IUD	0.5 - 2.0
Oral pill	0.1 - 0.5
Centchroman (Saheli)	1.83 - 2.84

Yuzpe and Lancee Method (emergency method of contraceptive)

- Method- Combined oral pills are generally accepted as the preparation of choice for Post-coital (Emergency) contraception. Regimens have to be 'completed within 72 hours of coitus': Sooner started, the more effective it is
- Regimens- Current recommendation (pills with 30 mcg oestrogen Mala-N/ Mala-D): 4 pills immediately followed by 4 pills after 12 hours later.
- Standard method (pills with 50 mcg oestrogen): 2 pills immediately followed by 2 pills 12 hours later
- Pills with 200 mcg estrogen: 1 pill immediately followed by 1 pill 12 hours later.

The Family Planning in Ayurvedic System of Medicine

The population of India 2012 about more than 122 crores. So the world is facing a critical & difficult days as the population are increasing very fast.

It is the bounden duty of ever educated citizen to see that the growth of population is retarded at an early date or else we have to face lack of clothing, housing & food.

The family planning methods which were in vague since time immemorial are to be adopted at least, to control the birth rate and live happily and healthy. Family planning adopted in Ayu[illegible] as

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well as explained in Ratimanjari, (1800 AD) Rasaratnas-amuchaya (1400AD), Bhavaprakasha (1600AD), Yogaratnakar (1800AD), Bhaishajya Ratnavali (1900AD), Atharvaveda (1200BC), Vatasayana Kama Sutra (300BC) & in Kousik Sutra there is description of Vasectomy in Male & Tubectomy in Female.

The following are some of the method s advocated in Ayurveda.

1. Brahmacharya
2. Avoiding coitus during Rutukala
3. Vaginal jelly, douches, plugging, fumigation.
4. Contraceptive to prevent the formation of semen or to produce defective ovum.
5. Coitus during Anrutukala (safe period)
6. Aborteficients
7. Prolonging marriage of couples.
8. The use of artificial aids like sheath in preventing conception.
9. Surgical methods.

1. Brahmacharya- The purpose of coitus during the ancient period was only to have a pregnancy & not mainly meant for sexual pleasure. So they have advised Brahmacharya as one of the major step of birth control. Ancient generation was finding Brahmacharya easy to adopt & practice in their day to day life.

2. Rutukala (Unsafe Period)-Rutukala means genetic period. It has been stated in Susrutha Samhita Sharira 5 chapter that Rutukala is stated to be 12 days after the last menstruation. In this period female reproduction & generative organs will produce ovum & it will be ready to receive sperms. It results a fertility station.

3. Anrutukala (Safe Period)- After period of unsafe period the reproductive organ of women will start receding like the petals of lotus. Which close in evening. It has been said that the period up to the next menstruation is Anrutukala or ungenetic period if the coitus is conducted in these periods there will be no. pregnancy.

4. Vaginal jelly, douches, plugging & fumigation etc to prevent pregnancy-

- Fumigation of vagina must be done with decoction of root of Nimba at the time of menstruation.
- The powdered root of Dhatura must be introduced into vagina
- Castor & gingerly oil may be kept inside vagina in a cotton before inter course.
- Powder of rock salt which is dipped in Tila oil be kept inside before coitus.
- The powder of seed of Palasha must be painted into vagina along with honey for 7 days.

5. Contraceptive to prevent the formation of semen or to produce defective ovum : Charakacharya has pointed out the etiology for delayed pregnancy in fertile women. When they are performing coitus during the period of Anrutukala & the aggravated Doshas in sperms & ovum's & defective in diet & activities of intercourse.

Some drugs administered internally to render the ovum or sperm defective in Ayurveda.

Bhavaprakash, Yogaratnakara, Vidyajeevana, Kamasutra are explain

1. Japakusuma, Puran Guda, Arnala (kanji) are to taken in equal proportion in dose of 5 Tola per day for a week.
2. पिप्पलीविड्गटंकणसमचूर्णयापिबेत्पयसा ।
ऋतुसमयेनहितस्यागर्भः संजायतेक्वापि॥
(यो. र. योनिव्यापतचिकित्सा)

   Pippali, Vidanga, Tankana powder mixture of drugs are taken for a week after menstruation in dose of 2 Grams each.
3. Kanji should be prepared in Japakusuma& must be taken for 3 days after. (Yo. Ra. Page 409)
4. Old Jaggery of the quality of a 1 Pala should be taken daily.
5. Three year old Jaggery must be administered for a period of 15 days in dose of 8 Tola per day.
6. Prepare a decoction from Chitraka root (lat. Plumbago zylylanica) & it should be taken for a period of 3 day after menstrual period.
7. Take Sarshapa seeds along with rice water will produce the sterility in female.

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8. Powder of Palasha seed must be taken orally with water for 3 days will also produce same effects.
9. If 3 castor seeds are administered for a week will prevent fertility for 2-3 years.
10. Administration of Sweta Gunga (Lat. Abrus precatorus) one on 4th day two day 5th & three on 6th day of menstruation has been found to produce the sterility.
11. Decoction of root bark of Agnimanth must be taken with rice water.
12. Talisapatra & Gairika must administer for 3 days or 4 day along with water.
13. Dhattura plant must be tied to the lady inner waist in the Krushna Paksha Chaturdarshi period will also prevent conception.
14. Haridra must be taken in water for 6 days after menstruation.
15. Castor oil & jingelly oil are mentioned as vaginal purifier they must be applied before sexual intercourse to produce sterility.

External use of contraceptives: Jaggery, Madanpala, seeds drone & Yavakshara. These must be powdered & must be kept for some hour in the milk of Snuhi & must be kept in vagina will produce menses.

6. Artificial Appliances : In Sushruta Chikitsa there is a mention that the penis must be covered with sheath. So even during those days gents were using sheath similar to 'Nirodh'

Artificial applications or a sheath made of different metals is preventing pregnancy.

7. Abortificients :

- Take the seeds of Gunja 1 part, Tankan & Dadima roots 3 parts & administer orally to produce abortion.
- Nirgudi should be made into a paste with Chitrak Mula & Madhu be taken in Karsha Pramana.
- Stem & Leaves of Eranda must be inserted into vagina up to 4 inches will produce abortion even up to 4 month.
- The lime of temple if administered in Karsha Pramana the lady will bleed immediately.
- The stool of horse must be grinded in liquid kanji & filtered & administered with rock salt.

8. Prolonging marriage of couples : Our ancient have advocated 25 years of age for an adult male & 16 years for a lady to marry. The delay in marriage time of the couple will indirectly prevent the pregnancy.

9. Surgical Methods :

1. Female sterilization
2. Male sterilization

Important Definitions in Demography

- Crude birth rate (CBR): Annual number of live births per 1000 mid year population.
- General fertility rate (GFR): Annual number of live births per 1000 women of childbearing age (15–49 years old, or 15–44 years old) mid-year population
- General marital fertility rate (GMFR): Annual number of live births per 1000 married women of childbearing age (15–49 years old, or 15–44 years old) mid-year population
- Age-specific fertility rates (ASFR): Annual number of live births per 1000 women in particular age groups (usually age 15–19 years, 20–24 years etc)
- Crude death rate (CDR): Annual number of deaths per 1000 mid year population
- Infant mortality rate (IMR): Annual number of deaths of children less than 1 year old per 1000 live births
- Expectation of life (Life expectancy): The number of years which an individual at a given age could expect to live at present mortality levels
- Total fertility rate (TFR): Number of live births per woman completing her reproductive life, if her childbearing at each age reflected current ASFRs
- Gross reproduction rate (GRR): Number of daughters who would be born to a woman completing her reproductive life at current ASFRs
- Net reproduction rate (NRR): Expected number of daughters, per newborn prospective

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MCQ On Family Welfeare Programme

1. Demographic Gap attains its maximum limit in:
   (a) Early Stage I (b) Late Stage II
   (c) Late Stage III (d) Early Stage IV
2. True about late expanding phase of demographic cycle:
   (a) Birth rate is lower than the death rate
   (b) Death rate begins to decline, while the birth rate remains unchanged
   (c) Death rate declines still further, and the birth rate tends to fall
   (d) High birth rate and high death rate
3. Contraction of Demographic-Gap starts in:
   (a) Stage I (b) Late Stage II
   (c) Early Stage III (d) Stage IV
4. In which stage of the demographic cycle is India currently?
   (a) High stationary (b) Late expanding
   (c) Early stationary (d) Low stationary
5. 'Demographic Processes' does not include:
   (a) Fertility (b) Morbidity
   (c) Mortality (d) Social mobility
6. In a demographic cycle low stationary phase corresponds to which stage?
   (a) First (b) Second
   (c) Third (d) Fourth
7. The fourth stage of the demographic cycle is:
   (a) Declining (b) Early expanding
   (c) High stationary (d) Low stationary
8. Third stage of demography indicates:
   (a) High birth rate and high death rate
   (b) Death rate begins to decline
   (c) While the birth rate remains unchanged
   (d) Birth rate tends to fall and death rate declines still further
9. Movement at socio-economic level is:
   (a) Social equality
   (b) Social mobility
   (c) Socio-economic upliftment
10. Late expanding stage of population in India is due to?
    (a) Birth rate stationary death rate continues to fall
    (b) Death rate declines faster than birth rate
    (c) Birth rate declines, death rate same
    (d) Birth rate is less than birth rate
11. Early expanding stage is denoted by:
    (a) Decreased birth rate and Decreased death rate
    (b) Increased birth rate and Increased death rate
    (c) Decreased birth rate and Increased death rate
    (d) Unchanged birth rate and Decreased death rate
12. At current growth rate, India's population will double in:
    (a) 23-28 years
    (b) 28-35 years
    (c) 35-47 years
    (d) 47-70 years
13. Current annual growth rate of a population can be calculated by:
    (a) Crude birth rate (CBR) minus Crude death rate (CDR)
    (b) Crude death rate (CDR) minus Crude birth rate (CBR)
    (c) Decadal growth rate/10
    (d) Crude birth rate (CBR) plus Crude death rate (CDR)
14. Crude birth rate is a simplest measure of fertility because it includes:
    (a) Total population (b) Mid-year population
    (c) Live births only (d) Pre-term births
15. Birth rate is:
    (a) Live birth/1000 mid year population
    (b) Birth/1000 mid year population
    (c) Live birth/10000 mid year population
    (d) Live birth/10,000 population of reproductive age group (15-45)
16. Crude birth rate – NOT true is:
    (a) It is a measure of fertility
    (b) It is actually a ratio not a rate
    (c) It is independent of age of population
    (d) Numerator does not include still births

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17. Population growth is rated to be 'explosive' if the annual growth rate exceeds:
(a) 2.0% (b) 1.5%
(c) 1.0% (d) 0.5%

18. In a community of 5000 people, the crude birth rate is 30 per 1000 people. The number of pregnant females is?
(a) 150 (b) 165
(c) 175 (d) 200

19. What is exponential growth?
(a) Rapid growth in population that leads to misbalance in birth and deaths
(b) Slow growth rate
(c) Growth limited by limiting factors
(d) None of the above

20. If Birth rate – 42 and death rate 31 then annual growth rate:
(a) 11% (b) 1.1%
(c) 0.25% (d) 2.5%

21. Denominator of crude birth rate is:
(a) Mid year population
(b) Number of living children
(c) Number of death children
(d) Total number of crude birth

22. Denominator in crude death rate is:
(a) Mid year population
(b) Mid year females 15-44 years
(c) Mid year marital females 14-44 years
(d) Mid year males 15-44 years

23. If annual growth rate of population is 1.5–2% the population is likely to get doubled in:
(a) 18-20 years (b) 20-23 years
(c) 28-35 years (d) 35-47 years

24. Age pyramid of India is:
(a) Broad at base and narrow at apex
(b) Broad from base to apex
(c) Broad at apex and narrow at base
(d) All

25. A contraceptive 'Z' is used by 100 couples for a continuous period of 2 years. During this period 20 women become pregnant despite using the contraceptive 'Z'. What is the Pearl Index of 'Z'?
(a) 0.1 per HWY (b) 5 per HWY
(c) 10 per HWY (d) 1000 per HWY

26. Contraceptive efficacy is measured by:
(a) Pearl Index only
(b) Pearl Index and Life table analysis
(c) Life table analysis and Couple protection rate
(d) Pearl Index and Couple protection rate

27. Eligible couples per 1000 population in India is:
(a) 50 – 70 (b) 100 – 120
(c) 150 – 180 (d) 200 – 250

28. In a village with 180 eligible couples, Family Planning data of contraceptive methods is:
(a) Sterilization: Vasectomy - 3 and Tubectomy - 8
(b) IUD users - 10
(c) Orals pills users - 10
(d) Condom users - 29
Effective CPR in the village is:
(e) 60% (f) 33%
(g) 25% (h) 10%

29. Scope of Modern Concept of family planning services include all of the following except:
(a) Screening for cervical cancer
(b) Providing services for unmarried mothers
(c) Screening for HIV infection
(d) Providing adoption services

30. Which of the following is important in calculation of pearl index:
(a) Number of abortions
(b) Total accidental pregnancy
(c) Socioeconomic status
(d) Total gestational period

31. Pearl Index is:
(a) Failures per 1000 women-years of exposure
(b) Failures per 100 women-years of exposure
(c) Failures per 10 women-years of exposure
(d) Failures per women-years of exposure

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32. Pearl index is defined as:
(a) Accidental pregnancies per 1000 women-years of exposure
(b) Accidental pregnancies per 100 women-years of exposure
(c) Accidental pregnancies per 10 women-years of exposure
(d) Accidental pregnancies per women-years of exposure

33. All parameters are used by epidemiologist in evaluation of the efficacy of acceptance of family planning method except:
(a) Annual general marriage rate
(b) Spacing between first and second child
(c) Annual birth rate
(d) Number of children born

34. 100 women, followed up for 20 months, with OCPs, 5 became pregnant. Calculate the Pearl Index:
(a) 1 (b) 2
(c) 3 (d) 4

35. "Pearl Index" Is normally used for studying the:
(a) Effectiveness of a contraceptive
(b) Unmet need for family planning
(c) Prevention of undesired pregnancies and of STD in young people
(d) Basis of women's response to survey questions

36. Population control can be achieved by:
(a) By spacing between the pregnancies
(b) By promoting infanticide
(c) By prohibiting infanticide
(d) Securing maximum involvement of nongovernmental agencies

37. Pearl index is used to evaluate:
(a) Family planning
(b) Contraceptive acceptance
(c) Population control
(d) Contraceptive failures

38. The couple protection rate (CPR) to bring within normal range in India, which of the following contraceptive measure is used?
(a) Sterilization
(b) IUCD
(c) Condom
(d) All of the above

39. Natural Family Planning does not include:
(a) Terminal methods
(b) Basal Body Temperature Method
(c) Cervical Mucus Method
(d) Symptothermic Method

40. Which of the following Natural method of contraception is most effective?
(a) Calendar method
(b) Billing method
(c) Symptothermic method
(d) Basal body temperature method

41. Match the contraceptive and its type

Contraceptive	Type of contraceptive
A. Vaginal Sponge	I. Subdermal implant
B. Norplant	II. Barrier Method
C. NET–EN	III. IUD
D. Grafenberg's Ring	IV. Depot formulation

(a) A - IV, B - II, C - III, D - I
(b) A - II, B - I, C - IV, D – III
(c) A - II, B - IV, C - I, D - III
(d) A - III, B - II, C - I, D – IV

42. Barrier methods are all except:
(a) Diaphragm (b) Foam tablets
(c) Vaginal-sponge (d) Lippes loop

43. TODAY, failure rate is:
(a) 0-5/100 woman years
(b) 5-10/100 women years
(c) 9-20/100 women years
(d) 0-1/100 woman years

44. 'Today' – a contraceptive contains:
(a) Prestaglandin F2
(b) Norethisterone
(c) 9-Nonoxynol
(d) Cu releasing mesh

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45. In Cu-T 380 A, 380 represents:
(a) No. of turns of copper wire
(b) Surface area of Cu-T in sq. mm
(c) Surface area of copper in sq. mm
(d) Effective Life of Cu-T in quarters

46. The most common side effect of IUD insertion is:
(a) Bleeding (b) Pain
(c) Pelvic infection (d) Ectopic pregnancy

47. All are true about Progestasert except:
(a) Progestasert releases 65 mcg progesterone per day
(b) Progestasert contains 38 mg progesterone
(c) Progestasert is implanted subdermally
(d) Progestasert is a T-shaped device

48. The most common side effect of IUD insertion, which requires its removal is:
(a) Bleeding (b) Pain
(c) Pelvic infection (d) Ectopic pregnancy

49. Characteristics of an ideal candidate for copper–T insertion include all of the following except:
(a) Has borne at least one child
(b) Is willing to check IUD tail
(c) Has a history of ectopic pregnancy
(d) Has normal menstrual periods

50. The following statements are true about Intrauterine devices (IUD) except:
(a) Multiload Cu-375 is a third generation IUD
(b) The pregnancy rate of Lippes loop and Cu-T 200 are similar
(c) IUD can be used for Emergency Contraception within 5 days
(d) Levonorgestrel releasing IUD has an effective life of 10 years

51. Copper – T is preferably inserted postnatal, after:
(a) 2 weeks (b) 4 weeks
(c) 5 weeks (d) 8 weeks

52. Which of the following IUDs do not require to be changed every 3-5 years?
(a) CuT 220 B (b) CuT ML-375
(c) CuT 380 A (d) CuT ML-250

53. Cu T 380A IUD should be replaced once in:
(a) 4 yrs (b) 6 yrs
(c) 8 yrs (d) 10 yrs

54. Non-medicated Intra Devices (IUDs) are called as:
(a) 3rd generation IUDs
(b) 2nd generation IUDs
(c) 1st generation IUDs
(d) Multi – load devices

55. IUD 'Mirena' release Levonorgestrel for ..... years:
(a) 3 (b) 5
(c) 7 (d) 10

56. Mechanism of action of IUD is:
(a) Prevent fertilization
(b) Prevention ovulation
(c) Prevent implantation
(d) Spermicidal

57. Third generation IUCD is:
(a) ML CuT 250 (b) MIRENA
(c) CuT 380 A (d) Copper -7

58. Nova T has:
(a) Silver core (b) Platinum core
(c) Copper core (d) Iron core

59. Radioopaque material in copper-T:
(a) Silicon (b) Barium sulphate
(c) Carbon (d) None

60. True statements of Nova-T:
(a) Effective for 10 years
(b) Silver core
(c) More copper content
(d) More chances of perforation

61. All of the following are the advantages of 3rd generation IUD's except:
(a) High efficacy
(b) Low expulsion rates
(c) Long acting
(d) Low risk of ectopic pregnancy

62. Third generation IUCD acts by:
(a) Strong anti-fertility effect of metallic copper
(b) By altering the composition of cervical mucous

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(c) Hormonal effect on mucosa of endometrium
(d) Enhanced cellular response on endometrium

63. Absolute contraindication of IUCD is:
(a) Anemia
(b) Diabetes
(c) PID
(d) Hemorrhage Demography, Family Planning and Contraception

64. Multi load device refers to:
(a) First generation IUCD
(b) Second generation IUCD
(c) Oral contraceptive pills
(d) Barrier contraceptives

65. Most effective Cu-T is:
(a) Cu-T 380 A (b) Cu- T 220
(c) Cu-T 200 (d) ML-Cu 250

66. All are true about Centchroman except:
(a) Centchroman is a non-steroidal contraceptive
(b) Centchroman has been developed in India
(c) Centchroman is useful for females with PCOD
(d) Failure rate of Centchroman is 1.83–2.84 per HWY

67. Consider the following sentence: Use of oral contraceptive pills confers additional protection against
I. Fibroadenoma
II. Ectopic pregnancy
III. Ovarian cysts and iron deficiency anemia
Which of these statements are correct?
(b) I and II (c) I and III
(d) II and III (e) I, II and III

68. If a women was taking oral contraceptive pill, then which of the following investigation would be related to the long term consumption of steroidal contraceptives?
1. Liver functions test
2. Cervical pap smear
3. Wet smear of vaginal secretions for monilial
4. Endometrial biopsy
(a) 2, 3 and 4 (b) 1, 3 and 4
(c) 1, 2 and 4 (d) 1, 2 and 3

69. Besides pregnancy the oral contraceptive protect against all except:
(a) Fibroadenoma breast
(b) Iron deficiency anemia
(c) Ovarian cancer
(d) Hepatocellular adenoma

70. How much ethinyl estradiol does the new low dose oral contraceptive pill contain (IN MICROGRAMS)?
(a) 20 (b) 25
(c) 30 (d) 35

71. Which one of the following is NOT an absolute contraindication for oral contraceptive pills?
(a) Nursing mothers
(b) Cancer of breasts
(c) Cardiac abnormalities
(d) History of thromboembolism

72. Mala – N oral contraceptive pill differs from Mala–D, in terms of:
(a) Norgestrol dosage
(b) Oestradiol dosage
(c) Sold under social marketing scheme
(d) Supplied free of cost

73. Contraindication of O.C.P. except:
(a) Liver disease (b) PID
(c) Renal disease (d) Epilepsy (A, C, D)

74. Contraceptive to be avoided in epilepsy is:
(a) Combined OCPs (b) Condoms
(c) IUDs
(d) Post-coital (emergency) pills

75. Non contraceptive benefits of combined oral pills is/ are reduction of except:
(a) Iron deficiency anaemia
(b) Breast cancer
(c) Ovarian cancer
(d) PID

76. Minipill is contraceptive of choice for:
(a) Elderly females (b) Lactating females
(c) Obese women (d) Menstruating women

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77. Which of the following is/are benefits of combined OCPs use except ?
(a) Hepatocellular adenoma
(b) PID
(c) Ovarian cysts
(d) Fibrocystic disease of breast

78. A woman using combined oral contraceptive has the following non-contraceptive benefits except:
(a) Protection against PID
(b) Prevention of colorectal malignancy
(c) Protection against ovarian cancer
(d) Protection against cervical cancer

79. Oral contraceptive cause:
(a) Monilial vaginitis (b) Pituitary adenoma
(c) Ca uterus (d) Ovarian cysts

80. A depot contraceptive DMPA is to be given every:
(a) 1 month (b) 2 months
(c) 3 months (d) 6 months

81. Non-contraceptive effect of oral contraceptive pills is all except:
(a) Protection against benign breast disease
(b) Prevention of ectopic pregnancy
(c) Dysmenorrhoea protection
(d) None

82. Serious complication of oral contraceptive is:
(a) Leg vein thrombosis
(b) Headache
(c) Break through bleeding
(d) Breast tenderness

83. A health worker who distributes O.C pills ____ checks all of the following except:
(a) Headache (b) Weight gain
(c) Breast tenderness
(d) Pervaginal bleeding

84. All are non-contraceptive advantages of oral contraceptive pills except:
(a) Pelvic inflammatory disease
(b) Hepatic adenoma
(c) Benign breast cancer
(d) Anemia

85. The side effects like irregular bleeding, depression are associated with use of:
(a) Mini pill (b) OC pills
(c) Mifepristone (d) None

86. The dose of ethinyl estradiol in Mala-N is:
(a) 20 µgm (b) 30 µgm
(c) 50 µgm (d) 100 µgm

87. The absolute contraindication for prescribing normal contraceptive pills in a woman of reproductive age group is:
(a) Epilepsy
(b) Diabetes mellitus
(c) Milk hypertension
(d) Congenital hyperlipidemia

88. Mala-N-contains NORGESTREL:
(a) 0.15 mg (b) 2 mg
(c) 5 mg (d) 10 mg

89. Minipills contain:
(a) Only progesterone is small quantity
(b) Progesterone and estrogen
(c) Estrogen in small quantity and progesterone in large
(d) Estrogen

90. DMPA is an injectable contraceptive given every:
(a) Three weeks (b) Two months
(c) Three months (d) Two years

91. All of the following can be used as emergency contraceptive measures except:
(a) Female condoms (b) IUD
(c) Minipill (d) Yuzpe and Lancee

92. Yuzpe and Lancee Method is used for:
(a) Sterilization with 'No Scalpel Technique'
(b) Emergency contraception with OCPs
(c) Emergency contraception with IUDs
(d) Evaluation of newer contraceptives

93. Which of the following is not used as an emergency contraceptive?
(a) LNG- Intrauterine device
(b) Oral LNG
(c) CuT-Intrauterine device
(d) Oral Mifepristone

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94. Yuzpee and Lancee regimen must be administered within maximum
(a) 3 hours (b) 12 hours
(c) 24 hours (d) 72 hours

95. What is used as emergency contraceptive?
(a) MALA-N (b) 0.75 mg LNG
(c) Copper T (d) All of the above

96. What is the Drug of choice for Emergency contraception?
(a) Yuzpe regimen (combined oral pill)
(b) High dose oestrogen alone
(c) Levonorgestrel only pill
(d) Danazol

97. Post coital contraceptives are all except:
(a) Norgestrel
(b) OCPs Demography, Family Planning and Contraception
(c) RU-486
(d) Copper-T

98. Following vasectomy for family planning. A patient should be advised to use some other method of contraception, till:
(a) Removal of all sutures
(b) Pain completely sutures
(c) Two weeks
(d) Eight weeks

99. A case of vasectomy is said to have failed as the vasectomised person's wife gives birth to a child ten months after the operation. Which one of the following is the most probable cause?
(a) Failure of the husband to use condom after vasectomy
(b) Surgical failure
(c) Recanalisation
(d) Wife had extramarital contact

100. Most common method of sterilization practiced in India:
(a) Female sterilization
(b) Male sterilization
(c) Both equally common
(d) None

101. Failure rate of Pomeroy's technique of sterilization?
(a) 0.1-0.5% (b) 0.5-1.0%
(c) 1-2% (d) 5-10%

102. Ideal time to perform post partum sterilization as per Government of India guidelines is
(a) From 12 hours to 7 days of delivery
(b) From 24 hours to 7 days of delivery
(c) From 48 hours to 7 days of delivery
(d) Within 7 days of delivery

103. Which of the following statements is incorrect?
(a) IUDs predispose to PID and Actinomycosis
(b) OCPs protect against Candidiasis
(c) Condoms are protective against PID
(d) Female condoms protect against STDs and HIV

104. Increased incidence of ectopic is associated with all except:
(a) IUD
(b) Combined oral pills
(c) Menstrual regulation
(d) Safe period method

105. Most cost effective family planning method is:
(a) Vasectomy (b) Tubectomy
(c) Copper T (d) Oral pills

106. Conventional Contraceptives are those which:
(a) Were discovered before 1960
(b) Require action after intercourse
(c) Require action at time of intercourse
(d) Require action before intercourse

107. All are Socio-demographic Goals of National Population Policy except:
(a) Achieve 100 % institutional deliveries
(b) Reduce MMR to < 100 per Lac LBs
(c) Achieve 100 % registration of births, deaths, marriages and pregnancies
(d) Prevent and control communicable diseases

108. The National Population Policy of India has set the following goals except:
(a) To bring down Total Fertility Rate (TFR) to replacement levels by 2015

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(b) To reduce the Infant Mortality Rate to 30 per 1000 live births
(c) To reduce the Maternal Mortality Rate to 100 per 100,000 live births
(d) 100 percent registration of births, deaths, marriages and pregnancies

109. Conventional contraceptive includes one of the following:
(a) Condom (b) Copper- T
(c) Oral pills (d) Tubectomy

110. The Medical Termination of Pregnancy Act does not protect act of termination of pregnancies after:
(a) 20 weeks (b) 24 weeks
(c) 28 weeks (d) 30 weeks

111. Best contraceptive for a newly married healthy couple:
(a) Barrier method (b) IUCD
(c) Oral contraceptive pills
(d) Natural methods

112. Regular reporting of health statistics is done for:
(a) To evaluate trends of a disease
(b) To appreciate health personnel's efforts
(c) For epidemiological research
(d) All of the above

113. Which of the fertility rates have Mid-year population as denominator?
(a) Crude birth rate
(b) General fertility rate
(c) General marital fertility rate
(d) All the above

114. Ideal Contraceptive for lactating women:
(a) POP (b) IUCD
(c) Lactation amenorrhoea
(d) Barrier methods

115. Ideal contraceptive for a couple who are living separately in two cities and meets only occasionally:
(a) Barrier methods (b) OCP's
(c) IUCD (d) Inj. DMPA

116. Ideal contraceptive for a newly married couple is:
(a) OCP (b) Barrier method
(c) IUCD (d) Natural methods

117. Under Medical Termination of Pregnancy Act (MTP) Act 1971 of India, permission for MTP has to be given by:
(a) Wife only
(b) Husband only
(c) Both wife and husband
(d) Guardian

118. Tubal block constitutes what proportion of female infertility?
(a) 5-7% (b) 15-20%
(c) 30-35% (d) 90-05%

119. Family planning services were voluntary in India from:
(a) 1956 (b) 1977
(c) 1992 (d) 1997

120. The contraceptive method of choice (temporary) for 37 years old well educated woman for 37 years old well educated woman:
(a) Mala-N (b) Mala-D
(c) I.U.D. (d) Diaphragm

121. Spermicide used in the contraceptive today:
(a) Norethinsosterol (b) Nonoxynol
(c) DMPA (d) NET-EN

122. Most cost effective contraceptive is:
(a) Vasectomy (b) Tubectomy
(c) Cu-T (d) OCP

Answers of MCQ Family Welfare Programme

1. Ans. (b) Late Stage II
2. Ans. (c) Death rate declines still further, and the birth rate tends to fall
3. Ans. (c) Early Stage III
4. Ans. (b) Late expanding
5. Ans. (b) Morbidity
6. Ans. (d) Fourth
7. Ans. (d) Low stationary

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8. Ans. (d) Birth rate tends to fall and death rate declines further
9. Ans. (b) Social mobility
10. Ans. (b) Death rate declines faster than birth rate
11. Ans. (d) Unchanged birth rate & Decreased death rate
12. Ans. (c) 35-47 years
13. Ans. (a) Crude birth rate (CBR) minus Crude death rate (CDR)
14. Ans. (b) Mid year population
15. Ans. (a) Live birth/1000 mid year population
16. Ans. (b) It is actually a ratio not a rate
17. Ans. (a) 2.0%
18. Ans. (b) 165 [Hint: Add 10% pregnancy wastage also
19. Ans. (a) Rapid growth in population that leads to misbalance in birth and deaths
20. Ans. (b) 1.1%
21. Ans. (a) Mid year population
22. Ans. (a) Mid year population
23. Ans. (d) 35-47 year
24. Ans. (a) Broad at base and narrow at apex
25. Ans. (c) 10 per HWY
26. Ans. (b) Pearl Index and Life table analysis
27. Ans. (c) 150 – 180
28. Ans. (c) 25%
29. Ans. (c) Screening for HIV infection
30. Ans. (b) Total accidental pregnancy
31. Ans. (b) Failures per 100 women-years of exposure
32. Ans. (b) Accidental pregnancies per 100 women-years of exposure
33. Ans. (a) Annual general marriage rate
34. Ans. (c) 3
35. Ans. (a) Effectiveness of a contraceptive
36. Ans. (a) By spacing between the pregnancies
37. Ans. (d) Contraceptive failures
38. Ans. (d) All of the above
39. Ans. (a) Terminal Methods
40. Ans. (c) Symptothermic method
41. Ans. (b) A - II, B - I, C - IV, D – III
42. Ans. (d) Lippes loop
43. Ans. (c) 9-20/100 women years
44. Ans. (c) 9-Nonoxynol
45. Ans. (c) Surface area of copper in sq. mm
46. Ans. (a) Bleeding
47. Ans. (c) Progestasert is implanted subdermally
48. Ans. (b) Pain
49. Ans. (c) Has a history of ectopic pregnancy
50. Ans. (a) Multiload Cu-375 is a third generation IUD
51. Ans. (d) 8 weeks
52. Ans. (c) CuT 380 A
53. Ans. (d) 10 yrs
54. Ans. (c) 1st generation IUDs
55. Ans. (b) 5
56. Ans. (a) Prevent fertilization
57. Ans. (b) MIRENA
58. Ans. (a) Silver core
59. Ans. (b) Barium sulphate
60. Ans. (b) Silver core
61. Ans. (d) Low risk of ectopic pregnancy
62. Ans. (c) Hormonal effect on mucosa of endometrium
63. Ans. (c) PID
64. Ans. (b) Second generation IUCD
65. Ans. (a) CuT 380 A
66. Ans. (c) Centchroman is useful for females with PCOD
67. Ans. (d) I, II and III
68. Ans. (d) 1, 2 and 3
69. Ans. (d) Hepatocellular adenoma
70. Ans. (a) 20
71. Ans. (a) Nursing mothers
72. Ans. (d) Supplied free of cost
73. Ans. (b) PID
74. Ans. (a) Combined OCPs
75. Ans. (b) Breast cancer
76. Ans. (b) Lactating females
77. Ans. (a) (a) Hepatocellular adenoma
78. Ans. (d) Protection against cervical cancer
79. Ans. (a) Monolial vaginitis

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80. Ans. (c) 3 months
81. Ans. (d) None
82. Ans. (a) Leg vein thrombosis
83. Ans. (d) Pervaginal bleeding
84. Ans. (b) Hepatic adenoma
85. Ans. (a) Mini pill
86. Ans. (b) 30 Ïgm
87. Ans. (d) Congenital hyperlipidemia
88. Ans. (a) 0.15 mg
89. Ans. (a) Only progesterone is small quantity
90. Ans. (c) Three months
91. Ans. (*a*) Female condoms
92. Ans. (b) Emergency contraception with OCPs
93. Ans. (a) LNG- Intrauterine device
94. Ans. (d) 72 hours
95. Ans. (d) All of the above
96. Ans. (c) Levonorgestrel only pill
97. Ans. (a) Norgestrel
98. Ans. (d) Eight weeks [correct answer is three months]
99. Ans. (b) Surgical failure
100. Ans. (a) Female sterilization
101. Ans. (a) 0.1-0.5%
102. Ans. (b) From 24 hours to 7 days of delivery
103. Ans. (b) OCPs protect against Candidiasis
104. Ans. (b) Combined oral pills
105. Ans. (a) Vasectomy
106. Ans. (c) Require action at time of intercourse
107. Ans. (a) Achieve 100% institutional deliveries
108. Ans. (a) To bring down Total Fertility Rate to replacement levels by 2015
109. Ans. (a) Condom
110. Ans. (a) 20 weeks
111. Ans. (c) Oral contraceptive pills
112. Ans. (d) All of the above
113. Ans. (e) All Choices
114. Ans. (b) IUCD
115. Ans. (a) Barrier methods
116. Ans. (a) OCP
117. Ans. (a) Wife only
118. Ans. (c) 30-35%
119. Ans. (b) 1977
120. Ans. (d) Diaphragm
121. Ans. (b) Nonoxynol
122. Ans. (a) Vasectomy

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Chapter 20

Preventive Geriatrics

Syllabus

Health problems of the aged and prevention and control measures. Relation between lifestyle and healthy aging. Role of Rasayana in preventive geriatrics.

Learning objectives

1. Enlist the health problems of the aged and explain their prevention and control measures.
2. Explain the relation between lifestyle and healthy aging.
3. Describe the role of Rasayana in preventive geriatrics.

Total - 2 hours (Lecture :1 hours, Non lecture: 1 hours)
MCQ- Yes- SAQ (5 Marks)- Yes- LAQ (10 Marks)- No

'Geriatrics' is the science that deals with the study of diseases and their treatment peculiar to old age (clinical gerontology, i.e., the study of pathological aspects of old age).

'Gerontology' is the study of physiological and psychological changes, which are incident to old age (i.e. study of aging process). There is no standard definition of old age. Aging is a normal, inevitable, biological phenomenon and it is not known when the old age begins. United Nations (1980) considers 60 years as the age of transition to the elderly age group. In India, people aged 60 years and above are treated as old. Old age is often classified into 'early old age' up to 75 years (elderly) and 'late old age' (very elderly) for those above 75 years. In developed countries, people at 65 years and beyond are treated as 'elderly.'

Aging is a natural process. In the words of Seneca "Old age is an incurable disease", but more recently Sir James sterling Ross commented "You do not heal old age You protect it You promote it You extend it".

Ageing is a natural, inevitable, irreversible, always progressive, biological phenomenon and associated with decline mental functions. No one knows when it is going to begin, but it is said that nobody grow old nearly for certain number of years. Ageing occurs at different levels like social, behavioural, physiological, morphological, cellular, and molecular.

Systemic problems and disabilities are common in old age due to structural and functional changes of body and these are multi factorial in nature. This health problem directly have impact on quality of life.

In year 2002 estimated 605 million old person in the world. By 2025 the number of elderly people is expected to rise more than 1.2 billion.

Ageing process- Ageing is the progressive and generalized impairment of functions resulting in the loss of adaptive response to stress and in increasing the risk of age related diseases. The overall effect of these alterations is an increase in the probability of dying, which is evident from the rise in age-specific death rates.

Aging is two types-

1. Natural aging (Kalaja Jara)- which occurs at or after the proper age i.e. 60 years even after following daily & seasonal routines explained in Swasthavritta & use of Shodhana at proper time. Appearance of sign & symptoms of aging at a particular scheduled age is considered as Kalaja

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Jara (normal aging). It is that which progress slowly, it is not curable &consider to be Yapya with treatment like Rasayana.

Factors responsible for Kalaja Jara (normal aging)-

1. Swabhava (natural factors)
2. Kala (time factor)
3. Vata
4. Shareera Vruddhukara Bhava - Abhava (kala yoga, Swabhava Samsiddhi, Ahara Sousthava, Avighata)

Jara is a Swabhava Bala Pravritta Vyadhi.

2. Premature aging (Akalaja Jara)- occurs before the age of 60 & due to improper health care measures. Akalaja means 'AsamayeJata' i.e. one which occurs untimely. Hence the sign & symptom of aging prior to schedule age is considered as Akalaja Jara (premature / unschedule aging) It is curable with Rasayana drugs according to Dosha& stage of aging.

Theories of aging

1. Master clock theory- on of the oldest. Theories & no longer has high credibility. It posits that aging is under direct genetic control. It suggests that the rate of aging within each species has developed for the good of each species.

2. Intoxication theory- proposed by T.H. montgomery, an eminent zoologist as metabolic waste products of toxic nature accumulate in the tissues through faulty excretory process to effect a true intoxication & aging of the organism. Some pathologist has considered what is known as 'brown pigment' in cellular components as the sign of aging.

3. Ruber theory- 1908 he presented evidence linking metabolic rate & aging. He postulated that life is a chemical chain reaction, the duration of which is dependent upon the concentration of the reactants & the rate of reaction. Physiological signs of aging are gradual deterioration in function & capacity to respond to environment stress. Metabolism slows, as does the ability to maintain a constant internal environment in response to change in temp. Diet & oxygen supply. Net decreases of cell in the body & to the dysfunction of cell that remain. The completion of the reaction results in death.

4. Rate of living theory-proposed by Pearls in 1928 & is closely related to Ruber'stheory. His theory is based on the concept that the duration of life varies inversely with the rate of energy expenditure.

5. Somatic mutation theory- Dr. Leo Szilard in 1959. According to him, genetic mutations of DNA accumulate with time, ultimate resulting in miscopying & functional failure. But this theory was not accepted as much research who investigated exhaustively indicated that somatic mutation is not involved in aging process.

6. The error catastrophe theory-proposed by Dr. Leslie Orgel in 1963 his hypothesis was that if an error was made in the Molecular copying processes that results in synthesis of a given protein, the faulty protein could then sets off a chain of flawed events which could result in an "Error Crisis" - a cascade of altered biochemical process that impair cellular functioning, such as that which occur in aging.

7. Cross linkage theory- proposed in 1968 by Dr. Johan Bjorsten who stated that an alteration secured in structural protein which caused them to develop inter & intermolecular cross link with other protein. The progress of cross linking process is responsible for the change that occurs with aging & at one stage it halts leading to th e cessation of cellular function.

8. Glycation theory or loose cannon theory- proposed by Dr. A. Cerami who held the view that non enzymatic reactions of glucose& other reducing sugar with amino groups of protein & nucleic acids result in a series of events which alter protein &nucleic structure& function. The process continues as the age advances contributing to the stiffening & loss of elasticity that occur in aging tissues.

9. Neuro-endocrine theory or weak link theory- proposed by Professor Vladimir Dilman Russia in

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1983. this theory states that aging is due to the losses of receptor sensitivity to feedback inhibition with time, resulting in a progressive shifting of homeostasis & alterations of hormone levels & there with time .

10. Free radical theory-one of the popular theories of aging was first proposed by Dr. Denham Harman in 1956. Aging results from an accumulation of changes caused by reactions in the body initiated by highly reactive molecules known as "Free Radicals". The change induced by free radical are believed a major cause of aging, diseases development and death.

Health Problems of the Aged

These are grouped into physiological, psychological, social and pathological problems.

Problem due to the aging process- No one knows when old age begins. The "biological age" of a person is not identical with his "chronological age". Our knowledge about ageing process is incomplete. We do not know much about the disabilities incident to the aging process. Following are some of the disability considered as incidents.

a. Senile cataract
b. Glaucoma
c. Nerve deafness
d. Osteoporosis affecting mobility
e. Emphysema
f. Failure of special senses
g. Change in mental outlook.

Problem associated with long term illness- Certain chronic diseases are more frequent among the older people than younger people.

1. Degeneration diseases of heart & blood vessels
2. Cancer
3. Accidents
4. Diabetes
5. Diseases of locomotors system
6. Respiratory illnesses
7. Genitourinary system-

Physiological Problems- These are normally occurring and are due to aging process (i.e. eugeric changes), resulting in disabilities. These are senile cataract, glaucoma, nerve deafness, bony senses affecting mobility, emphysema, failure of special changes, changes in physical outlook (wrinkles of the skin) and mental outlook.

Psychological Problems

- Mental changes: Loss of memory (senile dementia) associated with impaired comprehension and impaired intellectual performance.
- Decline in sexual performance resulting in physical and emotional disturbances.
- Isolation: Death of the kith and kin, lack of care by the younger generation, social maladjustment and such other leads to isolation.
- Depression: The symptoms of depression are lack of interest in the activities, sadness, unexplained crying spells, irritability, loss of memory, inability to concentrate, confusion, disorientation, thoughts of death or suicide, change of appetite and sleep pattern, persistent fatigue, lethargy, aches, etc. The factors predisposing for depression are isolation, poverty, presence of disease/diseases, suffering, emotional disturbances, lack of happiness, etc. The depression may even lead to suicide.

Social Problems

These are poverty (due to retirement, loss of income, more expenditure due to ill health, etc.), isolation (due to death of family members), maladjustment with younger generation, unhealthy life styles like smoking, alcoholism etc. Idleness and boredom are other social problems.

Pathological Problems

- Diseases of the heart and blood vessels: Such as hypertension, atherosclerosis, myocardial infarction, cerebrovascular diseases like stroke. There are two types of strokes:

a. Ischemic stroke is due to sudden block of blood supply to the brain (as in thromboembolic phenomenon) leading to paralysis of one side

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of the body. This occurs in 85 percent of patients.

b. Hemorrhagic stroke is due to sudden rupture of artery within the brain leading to brain hemorrhagic and paralysis of one half of the body.

- Cancer, diabetes mellitus, obesity
- Diseases of the eyes: These are cataract, age related macular degeneration (AMD), loss of vision due to refractive errors, retinopathy, etc.
- Diseases of bones and joints: These are spondylosis, myositis, fibrositis, osteoarthritis, osteoporosis, gout, rheumatoid arthritis, fractures, etc.
- Osteoarthritis is a chronic, irreversible degenerative condition causing permanent bone damage in joints.
- Osteoporosis is a silent disease causing fragile bones, leading to painful fractures in hips, spine, and wrists.
- Gout is an uric acid accumulation in joints, causing sudden pain, swelling, and tenderness.
- Rheumatoid arthritis causes inflammation in peripheral joints, causing disability, pain, joint destruction, and premature mortality.
- Diseases of the respiratory system: Common diseases are chronic bronchitis, bronchial asthma, emphysema, etc.
- Diseases of the genitourinary system: These are enlargement of prostate, incontinence of urine, dysuria, nocturia, urinary infection, fecal incontinence, etc.
- Diseases of the nervous system: Common are Alzheimer's disease and Parkinson's disease. Alzheimer's disease is a gradual brain degenerative condition affecting memory, intellectual, emotional, and behavioral abilities as it spreads. There is no known cause. Older the age, greater the risk of developing the disease. After 60, the risk is one in 20, but after 80, it is one in 5.

Prevention and Control Measures and Aged

Early childhood and adolescent promotive measures are considered 'pregeriatric care', aiming to add life to years, reduce disability, and improve quality of life.

Primary Prevention

Health Promotion- These are the measures to remain healthy in old age. These are:

- Control the blood pressure, weight and diabetes if any.
- Avoid smoking and limit alcohol intake to lead healthy life style.
- Exercise unlocks muscle stem cells and rejuvenates old muscles. Endurance exercise enhances locomotion, prevents dementia, and improves mental health.
- Avoidance of drug abuse and self-medication.
- A balanced diet low in saturated fats, refined sugars, fast foods. Add calcium rich diet, fruits vegetables and greens. Tomatoes can save from high cholesterol and hypertension because of a pigment, lycopene, which has antioxidant property. It is also found in watermelon, guava and papaya.
- Engage in diverse activities like reading, writing, music, puzzles, and social work to keep brain exercise and engage.
- Avoid loneliness by engaging in recreational activities.
- Drink enough water to keep away from chances of renal stones and urinary problems.
- Periodical screening for blood pressure, vision and hearing.
- Plan for future financial, housing and disease security.
- They should build up a large circle of friends and well-wishers by selfless behaviour, kindness and social service, which will prove useful to them.
- Yoga exercises and meditation goes a long way in promoting the health.

Specific Protection- All aged people must be immunized against diseases such as influenza, pneumococcal pneumonia, tetanus and hepatitis B. They must also be immunized selectively against, hepatitis A, meningococcal meningitis, Japanese encephalitis and rabies.

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Secondary Prevention

Early Diagnosis and Treatment- Since most of the diseases of the old age are predictable, they can be identified by periodic screening for health and start treatment. Timely detection and intervention can preserve the quality of life. The elderly people are educated about the 'danger signals' of cancer. Women are educated regarding self-palpation of breasts for presence of lump.

Exfoliative cytology of vaginal/cervical smear (Pap smear) examination of all those women, who have attained menopause and complain of vaginal bleeding to rule out cancer cervix.

Tertiary Prevention

Disability Limitation- This consists of giving an intensive treatment in the hospital for those who come in the advanced stage of the disease.

Rehabilitation- This consists of training and retraining the patients with the remaining capacity so that they can build up self confidence to take care of themselves. The various measures of rehabilitation are:

- Cataract surgery, provision of spectacles
- Hearing aids, artificial limbs, ear moulds, prostheses, etc.
- Physiotherapy, vocational therapy, psychological and social therapy depending upon their functional capacities.
- Deaddiction counselling for those who have become addicts.

Improvement in the quality of life is done by the following measures in the community:

- Organization of cultural programs like Harikathas, Bhajans, etc.
- Arrangement of the picnics and tours.
- Establishment of old age clubs, where the members are given training in yoga, meditation, philosophy, etc.
- Establishment of old age homes for the destitute elderly persons.
- This could be done on the basis of some payments.

Role of Rasayana in Preventive Geriatrics

A/C Charaka "A procedure by which Rasadi Sapta Dhatu is sanctified in all respect through proper nourishment is known as Rasayana."

A/C Dalhana "A therapy through which the drugs prevents the senility, cures the diseases, preserve the youthful state & act as restorative."

A/C Bhavamishra " A therapy which stops or prevents the senility & cures the diseases is known as Rasayana."

a) Types of Rasayana

According to mode of administration-

1. Kutipraveshila Rasayana
2. Vatatapika Rasayana

b) According to objective

- Kamya Rasayana (Prana, Medha, Shari)
- Naimittika Rasayana (specific disease)
- Ajasrika Rasayana (Satvika Ahara)

c) Special Rasayana drugs-

1. Medhya Rasayana
2. Achara Rasayana

d) According to effects-

1. Samshodhana Rasayana
2. Samshamana Rasayana

e) According to uses-

Shshruta Acharya Explains-

1. Sarvaopaghata Shamaneeya
2. Medhayusha Kameeya
3. Swabhava Vyadhi Pratishedhaneeya
4. Nivrutta Santapeeya

Rasayana effect of geriatric

As per our classics Rasayana therapy works on Agni which in turn leads to proper formation of Rasadi Dhatus, hence responsible for creation of Ojas which is considered as prime essence of these Rasadi Dhatus. Which is responsible for proper working of immune system of body in terms of Vyadhi Kshamatva, Hence Rasayana plays a crucial role in prevention of aging and old age-

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related disorders. It also enhances bodily strength and mental faculties.

List of formulations indication in Jara

Choornakalpana

1. Amlakasaya Brahma Rasayana (A.H.)
2. Amalaki Rasayana (A.H.)
3. Asanadichoorna Rasayana (A.H.)
4. Ashwagandha Choorna (A.H.)
5. Bringarajadi Choorna(B.R.)
6. Prathama Triphala Rasayana (R.R.S.)
7. Dvutiya Triphala Rasayana (R.R.S.)
8. Triteeya Triphala Rasayana (R.R.S.)

Vati Kalpana

1. Vidangadiyoga(A.H.)

Lavana Kalpana

1. Shishruta Narikela Prayoga(R.R.S.)

Taila Kalpana

1. Tuvaraka Taila (A.H.)

Lehyakalpana

1. Prathama Bhramha Rasayana (Charaka)
2. Chavanaprasha (Charaka)
3. Chanr. Amalaka Rasayana (Charaka)
4. Dhatri Rasayana (A.H.)
5. Beeja Rasayana (A.H.)
6. Jaranashaka Vidangadi Rasayana (A.H.)
7. Swagata Jaranashaka Beejaka Rasayana (A.H.)
8. Haritaki Yoga (A.S.)
9. Triphala Yoga (A.S.)
10. Tushanyadi Yoga (A.S.)
11. Vruddhadaruka Rasayana (B.R.)

Yoga's

1. Indra Rasayana (Charaka)
2. Shilajeeta (A.H.)
3. Swarana Makshika Yoga (A.S.)
4. Jaranashaka Makshika Yoga (A.S.)
5. Amrtarnava Rasa (B.R.)
6. Barhat Poorna Chandraodaya Rasa (B.R.)
7. Sarva Rogahara Rasayan (B.R.)
8. Mashika Rasayana (R.R.S.)
9. Pippalyadi Rasayana (RRS)

Other Yoga

1. Pathya Rasayana (C.D.)
2. Ashwagamda Rasayana (C.D.)
3. Jala Rasayana (C.D.)
4. Triphala Rasayana (Charaka)
5. Indrikta Rasayana (Charaka)
6. Varhikamda Yoga (A.H.)

Health Policies of the Aged

Benefits given to senior citizens of India-

1. National Policy on Older Persons (NPOP)-established in 1999, aims to protect older persons from unprotected, ignored, and marginalized concerns. National Policy prioritizes the well-being of older persons, fostering purpose, dignity, and peace in their final phase. NPOP envisions State extend support for financial security, healthcare, nutrition, and legal rights for senior citizens, focusing on collaboration between government and non-governmental agencies.

2. Ministry of Rural Development- Older adults over 65 who are in need of assistance are given Central Assistance of 75 Rupees a month under the National Old Age Pension Scheme. The Annapurna Scheme offers free food grains (wheat or rice) up to 10 kg per month to elderly people over 65 who are in need but are not currently receiving an old age pension.

3. Ministry of Finance: Section 88 of the Finance Act of 1992 offers income tax rebates to elderly people who have reached the age of 65 at any point during the relevant prior year, up to 15,000/- or actual tax, whichever is less.

4. Ministry of Health and Family Welfare: Separate queues are provided to senior citizens in the hospitals for registration and clinical examinations.

5. Ministry of Railways: Senior citizens receive increased concessions for booking and cancelling railway tickets.

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6. Ministry of Civil Aviation: 50% discount on domestic flights for 65+ and 62+ passengers on Sahara India Airlines.

7. Department of Post Office: A new scheme called 'Senior Citizen Saving Scheme' has been notified.

8. Indira Gandhi National Old Age Pension Scheme- The scheme "Indira Gandhi National Old Age Pension Scheme (IGNOAPS)" is one of the five sub-schemes of the National Social Assistance Programme (NSAP). Under IGNOAPS, citizens living Below Poverty Line and 60 years or above in age are eligible to apply. A monthly pension of Ē 200 up to 79 years and Ē 500 thereafter.

9. Annapurna Scheme - This a central sector scheme which aims to fulfl the needs of Senior Citizens who, despite being eligible, have not received benefits under the National Old Age Pension Scheme (NOAPS). It was launched by the Ministry of Rural Development in 2000-2001.

10. HelpAge India- It is an Indian organization where Jibby and the government are focused on the concerns of elders and support geriatric initiatives. Established in 1978, The aim is to serve disadvantaged elders in a holistic manner, enabling them to live active, dignified, and healthier lives.

MCQ On Preventive Feriatrics

1. Which of the following statements regarding Definition of Old age is not true:
   a) Most developed countries have accepted the chronological age of 65 years as a definition of 'elderly or older person
   b) In contrast to the chronological milestones which mark life stages in the developed world, old age in many developing countries is seen to begin at the point when active contribution is no longer possible."
   c) Government of India adopted 'National Policy on Older Persons' In January, 1999. The policy defines 'senior citizen or 'elderly as a person who is 60 years of age or above.
   d) The United Nations generally uses 65+ years to refer to the older population
2. The elderly population (>60 years) accounted for what percent of total population of India in 2011.
   a) 6.2% b) 7.4 %
   c) 8.3% d) 9.3%
3. Which of the following statements regarding diet of the elderly is true.
   a) Elderly persons require more calories as compared to young adults.
   b) Healthy food habits (& regular physical activity) are required to minimize the ill effects of ageing and to improve the quality of life.
   c) Elderly persons need less calcium, iron, zinc, vitamin A to prevent age-related degenerative diseases.
   d) ICMR expert group has recommended that elderly persons require more proteins as compared to young adults.
4. In India, organized sector provides pension for retired persons. But for others, The Ministry of Rural Development has implemented the National Old-Age Pension Scheme (NOAPS) - for persons above 65 years belonging to a household below poverty line. The amount paid per month is:
   a) Rs 200 per month. b) Rs 150 per month.
   c) Rs 250 per month. d) Rs 300 per month.
5. Cancer is one of the leading causes of death in the elderly, choose the cancers in descending order of the Healthy Life Years Lost globally (2008)
   a. Lung cancer, b. Stomach cancer,
   c. Liver cancer,
   d. Mouth & oropharynx cancers
   a) a,b,c,d b) a,b,d,c
   c) d,c,b,a d) d,a,b,c
6. Which type of dementia is associated with Behavioral and psychological symptoms of dementia (BPSD)?
   a) Alzheimer's dementia
   b) Vascular Dementia
   c) Lew Body Dementia
   d) Frontotemporal Dementia

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Answers of Mcq On Preventive Feriatrics

1. Ans. (d) The United Nations generally uses 65+ years to refer to the older population
2. Ans. (c) 8.3%
3. Ans. (b) Healthy food habits (& regular physical activity) are required to minimize the ill effects of ageing and to improve the quality of life.
4. Ans. (a) Rs 200 per month.
5. Ans. (a) a,b,c,d
6. Ans. (b) Vascular Dementia

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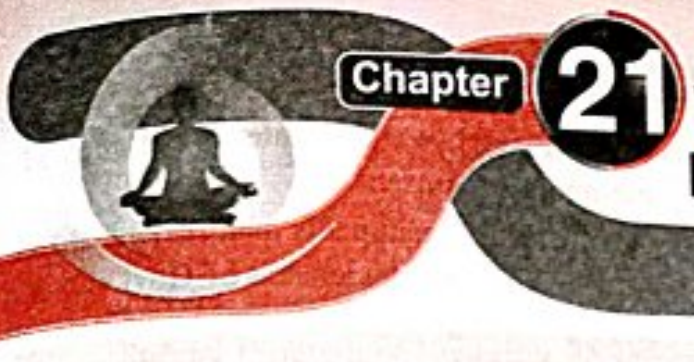

Chapter 21 World Health Organization and International Health Agencies

Syllabus

Definition of World Health organization. Structure, regions, and works of the World Health Organization. Functions of various international health agencies - United Nations health agencies, Bilateral health agencies and Non-Governmental agencies. Contribution of the World health organization to the global acceptance of Ayurveda.

Learning objectives

1. Define and describe the structure, regions, and works of the World Health Organization
2. Describe the functions of various international health agencies - United Nations health agencies, bilateral health agencies, and Non- Governmental agencies.
3. Describe the contribution of the world health organization to the global acceptance of Ayurveda

Total – 3 hours (Lecture :2 hours, Non lecture: 1 hours)
MCQ- Yes- SAQ (5 Marks)- Yes- LAQ (10 Marks)- No

World Health Organization

It is a specialized, non-political health agency of untied nation with headquarters at Geneva.

History

- During conference held at San Francisco WHO took its origin in April 1945.
- Constitution was drawn in International health conference at New York in 1946.
- Formal existence of WHO began on 7th April 1948.
- Every year 7th April is celebrated as World Health Day.

Objectives

1. The attainment by all people of the highest level of health
2. Health for all 2000 A.D.

Aims

1. Health is a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity.
2. Enjoyment of highest attainable standard of health by all without differentiation of race, religion, political belief, economic and social condition.
3. Health promotion and protection by state.
4. Healthy development of child is of basic importance.
5. Informed opinion and active co-operation on the part of the public care most important in improvement health of people.
6. Govt. has responsible for health of their people.

Two important health policies -

1. Alma Atta conference in 1978 on Primary Health Care.
2. Global strategy for Health for all by 2000.

Both WHO & UNICEF are striving towards the goal.

Eligibility for membership

- Open to all countries.
- In 1996 WHO had 190 member states & 2 associate members.

Functions of WHO

1. Act as directing coordinating authority on all international health works.

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2. Permits WHO member states to identify collectively priority of health problem throughout the world.
3. Define collectively health policy & targets to cope with them.
4. Device strategies, principles and programmers.
5. For establishing promoting international standard in the field of health.

Broad areas

1. Prevention and control of specific diseases.
2. Development of comprehensive health services throughout the world.
3. Family health improvement.
4. Environmental health monitoring & protection.
5. Regular updating of health statistics.
6. Support to biomedical research.
7. Publication of health literature & information.
8. Co-operation with other agencies.

Structure of WHO

Principle organs-

1. World Health Assembly
2. Executive board
3. The secretariat

World Health Assembly

It is the supreme governing body of the organization and consists of delegates of the Member States, each of whom carries one vote. The Assembly meets every year in May, usually at Geneva. It may also hold meeting at other places. For example, the Fourteenth Assembly met in Delhi in 1961.

Functions-

1. To determine international health policy & program.
2. To review work of past year.
3. To approve budget needed for the following year.
4. To elect member states to designate a person to serve for executive boards & to replace retiring members.

The Executive Board-

- Initially 18 members were present. They are designated by member states & presently 32 members are present.
- Members are "technically qualified in field of health." they are designated by Govt. but do not represent govt.
- 1/3rd of members are replaced each year.
- Meeting is held twice in a year. Effective decision & policies of assembly.
- It has power to take measures during emergency like, epidemics, earth quakes, flood etc.

The Secretariat- Director General is the head & chief technical & administrative officer of WHO at Geneva.

Function- The WHO Secretariat is the administrative wing of the WHO headed by the Director-General. It comprises about 5000 international public servants working in 14divisions and13 programs listed below:

Divisions

1. Division of Epidemiological Surveillance and Health Situation and Trend Assessment
2. Division of Communicable Diseases
3. Division of Vector Biology and Control
4. Division of Environmental Health
5. Division of Public Information and Education for Health
6. Division of Mental Health
7. Division of Diagnostic, Therapeutic and Rehabilitative Technology
8. Division of Strengthening of Health Services
9. Division of Family Health
10. Division of Non-communicable Diseases
11. Division of Health Manpower Development
12. Division of Information Systems Support
13. Division of Personnel and General Services
14. Division of Budget and Finance.

Programs

1. Health and Biomedical Information Program
2. Malaria Action Program
3. Parasitic Diseases Program
4. Expanded Program on Immunization

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5. Diarrheal Diseases Control Program
6. Program for External Coordination
7. Special Program for Research and Training in Tropical Diseases
8. Special Program of Research, Development and
9. Research Training in Human Reproduction Action Program on Essential Drugs
10. Special Program on AIDS
11. Pharmaceuticals
12. Health for All Strategy Coordination
13. Office of Research Promotion and Development.

The WHO Secretariat provides technical and managerial support to member states for planning and implementing their national health programs. Besides the Director-General, the Secretariat also has five assistant Director-Generals, under whom the various divisions listed above are placed. The first Director-General of WHO was Dr Brock Chisholm, a man of wide vision.

Regions and headquarters and regions

S.	Regions	Regional head quarters
1	South East Asia	New Delhi (India)
2	Africa	Harare (Zimbabwe)
3	America	Washington (USA)
4	Europe	Compenham (Denmark)
5	Eastern Mediterranean	Alexandria (Egypt)
6	Western Paci phic	Manila (Philippines)
7	Main head quarter	Geneva

Alma Atta Declaration

- In 1978 International conference was held at Alma Atta. (USSR).
- A new approach to health care came into existence as a part of movement set world health assembly 1977 i.e. Health for all by 2000.
- Fundamental principle of HFA strategy is equality that is equal health status for people & countries with an equitable distribution of health resources.
- Alma Atta conference brought the concept of 'primary health care', especially to vast majority of rural people & urban poor without health care facility.
- It called all Governments to make national polices, strategies & plan of action to implement & sustain primary Health care as an integral part of national health system.

International Health Agencies - United Nations Agencies, Health Work of Bilateral Agencies

Health services in developing countries mostly reflect their own widely varying capacities. The international system plays an ancillary role, comprising four types of agency: multilateral, bilateral, nongovernmental, and other.

Multilateral Agencies

The term multilateral means that funding comes from multiple governments (as well as from non-governmental sources) and is distributed to many different countries. The major multilateral organizations are all part of the United Nations.

1. The United Nations is made up of 192 countries from around the world. It is often called the UN.
2. It was set up in 1945, after the Second World War, as a way of bringing people together and to avoid further wars.
3. It started with 51 countries. The United Kingdom is one of the original members. Germany did not join until 1973.

The UN has 4 main purposes-

1. To keep peace throughout the world;
2. To develop friendly relations among nations;
3. To help nations work together to improve the lives of poor people, to conquer hunger, disease and illiteracy, and to encourage respect for each other's rights and freedoms;
4. To be a center for harmonizing the actions of nations to achieve these goals.

The World Health Organization (WHO) is the premier international health organization of the UN

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with its headquarters at Geneva. Technically it is an "intergovernmental agency related to the United Nations." WHO and other such intergovernmental agencies are "separate, autonomous organizations which, by special agreements, work with the UN and each other through the coordinating machinery of the Economic and Social Council." According to its constitution (1948) its principal goal is "the attainment by all peoples of the highest possible level of health."

WHO has three main divisions. The governing body - the World Health Assembly, meets once a year to approve the budget and decide on major matters of health policy.

All the 200 or so member nations send delegations. The World Health Assembly elects

31 member nations to designate health experts for the Executive Board, which meets twice a year and serves as the liaison between the Assembly and the Secretariat, which carries on the day-to-day work of the WHO. The Secretariat has a staff of about 4,500,with 30% of the employees at headquarters in Geneva, 30% in six regional field offices, and 40% in individual countries, either as country-wide WHO representatives or as representatives of special WHO programs.

World Bank

The World Bank (International Bank for Reconstruction and Development) was established in 1944 to raise the standard of living in the less developed countries. It gives loan for projects that are aimed at economic growth. Its projects are diverse, including electricity, transport, water supply, agriculture, health, welfare and population control. The World Bank is owned by 183 member countries. The World Bank group is the world's largest source of development assistance. It works in more than 100 developing countries with its primary focus of helping the poorest people in the poorest countries. The Bank provides nearly 16 billion US dollars every year in loans to its client countries. Currently, in India, the World Bank is supporting the two largest programs in the health sector anywhere in the world. These are the National Program for Control of Blindness and the National AIDS Control Program.

United Nations Children's Fund (UNICEF)

The United Nations Children's Fund (UNICEF) is a United Nations Programme headquartered in New York City that provides long-term humanitarian and developmental assistance to children and mothers in developing countries. It is one of the members of the United Nations Development Group and its Executive Committee.

UNICEF was created by the United Nations General Assembly on December 11, 1946, to provide emergency food and healthcare to children in countries that had been devastated by World War II. In 1954, UNICEF became a permanent part of the United Nations System and its name was shortened from the original United Nations

International Children's Emergency Fund but it has continued to be known by the popular acronym based on this old name. UNICEF relies on contributions from governments and private donors. Governments contribute two thirds of the organization's resources; private groups and some 6 million individuals contribute the rest through the National Committees. It is estimated that 91.8% of their revenue is distributed to Program Services. UNICEF's programs emphasize developing community level services to promote the health and well-being of children. UNICEF was awarded the Nobel Peace Prize in 1965 and the Prince of Asturias Award of Concord in 2006.

Most of UNICEF's work is in the field, with staff in over 190 countries and territories. More than 200 country offices carry out UNICEF's mission through a program developed with host governments. Seventeen regional offices provide technical assistance to country offices as needed.

The United Nations International Children's Emergency Fund was established by the UN in 1946 to provide help and relief to children in countries where the Second

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World War had caused wide damage. In 1953, it was renamed as United Nations Children's Fund but the abbreviation UNICEF was retained.

The UNICEF has the following offices:

1. UNICEF Headquarter Office at New York
2. UNICEF Regional Office for Europe at Geneva
3. UNICEF Regional Office for Eastern and Southern Africa at Nairobi
4. UNICEF Regional Office for West and Central Africa at Abidjan
5. UNICEF Regional Office for the America and the Caribbean at Bogota
6. UNICEF Regional Office for East Asia and the Pacific at Bangkok
7. UNICEF Regional Office for the Middle East and North Africa at Amman
8. UNICEF Regional Office for South Asia at Kathmandu
9. UNICEF Regional Office for Central and Eastern Europe, Commonwealth of Independent States and Baltic States at Geneva
10. UNICEF Office for Japan at Tokyo.
11. India falls under the South Asia region along with Bangladesh, Bhutan, Pakistan, Afghanistan, Nepal, SriLanka and Maldives.

Functions of UNICEF

During its earlier years of functioning, the UNICEF worked in close collaboration with WHO and sponsored the BCG campaign, campaigns against VD and malaria, and the distribution of skimmed milk. Later, it started supporting in a big way the programs related to maternal and child health, nutrition, health education and environmental sanitation, including water supply. The recent tendency on the part of UNICEF is to give more emphasis on integrated maternal and child health programs. In India, the Integrated Child Development Service (ICDS), has received substantial inputs from the UNICEF. The EPI (Expanded Program of Immunization) is also supported by the UNICEF. Primary Health Care, ORT (management of diarrhoea through oral rehydration therapy) and promotion of breastfeeding are some of its other areas of interest. The UNICEF has also provided support for programs aimed at controlling goitre, anaemia and xerophthalmia.

The four areas of special emphasis by the UNICEF are child health, child nutrition, family and child welfare and education. The UNICEF has also played an important role in the field of water supply and sanitation. The UNICEF also proposes to play a more positive role in family planning.

Food and Agriculture Organization (FAO)

Formed in 1945 with Headquarters in Rome, its prime concern is the increased production of food to keep pace with the ever-growing world population.

The chief aims of FAO are:

1. To help nations raise living standards
2. To improve nutrition of the people of all countries
3. To increase the efficiency of farming, forestry and fisheries
4. To better the condition of rural people and, through all these means,
5. To widen the opportunity of all people for productive work.

The joint WHO/FAO expert committees have provided the basis for many cooperative activities – nutritional surveys, training courses, seminars and the coordination of research programmers on brucellosis and other zoo noses

The FAO is also linked to the World Food Program (WFP) and works in close collaboration with the WHO. The WHO and FAO have jointly sponsored a large number of expert committees on food and nutrition, the recommendations of which have been published as Technical Report Series of the WHO/FAO. The FAO also shares interest in control of brucellosis and other zoonoses.

Since 1994, FAO has undergone major restructuring. The reforms include increased

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emphasis on food security, increased use of experts from developing countries and broadened links with the private sector and nongovernmental organization.

United Nation Development Programme (UNDP)

The UNDP projects cover virtually every economic and social sector – agriculture, industry, education and science, health, social welfare, etc. The member countries – rich and poor – of the United Nations meet annually and submitting proposal to the UNDP.

Focused areas

1. Poverty Reduction & Millennium Development Goals
2. Democratic Governance
3. Environment & Energy for sustain development
4. Crisis Prevention & Recovery

Functions – UNDP

1. UNDP is at the center of the UN's efforts to reduce global poverty.
2. Chairs the United Nations Development Group (UNDG), which includes the UN'skey players in international development.
3. UNDP's network links and coordinates global and national efforts to achieve the Millennium Development Goals (MDGs),
4. At the country level, UNDP plays two important roles, one as a partner for development work and the other as manager of the Resident Coordinator system.
5. UNDP helps developing countries attract and use aid effectively.
6. It encourages the protection of human rights and the empowerment of women.
7. Coordinates the development activities of the United Nations.
8. Plays a key role in helping to reform the UN as part of the United Nation Development Group (UNDG).

The United Nations Fund For Population Activities (UNFPA)

The United Nations Fund for Population Activities carries out programs in over 130 countries and territories. The Fund's aims are to build up capacity to respond to the needs in population and family planning. UNFPA began operations in 1869. UNFPA has three main program areas: Reproductive Health including Family Planning and Sexual Health; Population and Development strategies and Advocacy.

1. Providing assistance to India since 1974.
2. Funding national level schemes, area projects for intensive development of health and family welfare infrastructure and improvement in the availability of services in the rural areas
3. To develop national capability for the manufacture of contraceptives,
4. To develop population education programmers,
5. To undertake organized sector projects,
6. To strengthen programme management as well as to improve output of grass –root level health workers and
7. Introduction of innovative approaches to family planning and MCH care

International Labor Organization (ILO)

Soon after the First World War, it was recognized that problems of industry, like disease, know no frontiers. In 1919, ILO was established as an affiliate of the League of Nations to improve the working and living conditions of the working population all over the world. The headquarters of ILO is in Geneva, Switzerland.

The purposes of ILO are:

1. To contribute to the establishment of lasting peace by promoting social justice
2. To improve, through international action, labor conditions, and living standards
3. To promote economic and social stability.

ILO is the only tripartite U.N. agency with

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government, employer, and worker representatives. This tripartite structure makes forum in which the governments and the social partners of the economy of its 183 Member States. They can freely and openly debate and elaborate labour standards and policies.

United Nations Educational, Scientific And Cultural Organization (UNESCO)

The United Nations Educational, Scientific and Cultural Organization was formed in 1945 and currently has 188members. The main objective of UNESCO is to contribute to peace and security in the world by promoting collaboration among nations through education, science, culture and communication. In 2000 AD, its budget was 400 million US Dollars. UNESCO publishes the World Education Report annually.

United Nations High Commission for Refugees (UNHCR)

The United Nations High Commission for Refugees was established in 1950 to provide protection and assistance to refugees. Refugees are legally defined as people who are outside their countries of origin because of a well founded fear of persecution based on their race, religion, nationality, political opinion or membership in a particular social group, and who cannot or do not want to return home. As a humanitarian non-political organization, UNHCR has two basic aims—to protect refugees and to seek ways to help them restart their live-in a normal environment. In addition to refugees, there are an estimated 20 to 25 million internally displace persons, i.e. people who have fled their homes generally during a civil wat, but have stayed in their home countries. UNHCR also helps these internally displace persons. Health care is also an integral part of such operations of UNHCR.

The United Nations Industrial Development Organization (UNIDO)

The United Nations Industrial Development Organization helps developing countries in their fight against marginalization in today's globalized world. UNIDO was set up in 1966 and became a specialized agency of the United Nations in 1985.

UNAIDS

UNAIDS is a joint United Nations Program on HIV/AIDS. The partners in this joint program include UNICEF, UNDP, UNFPA, UNDCP, UNESCO, WHO and the World Bank. Specific global targets addressing an expanded response to the HIV/AIDS epidemic are the main activity of the organization. The Inter country Office for the South Asia Region is based at New Delhi.

Bilateral Agencies

In addition to supporting multilateral agencies, most industrialized nations also provide aid on a "country-to-country" basis, attempting to match a recipient's needs with the donor's objectives and capacity to assist, usually subject to political considerations. Smaller donors are geographically selective; for example, Australia emphasizes its Western-Pacific neighbors. Others emphasize their expertise; for example, the Netherlands supports water technologies. Some follow historical links; for example, France emphasizes its former colonies. Some both receive and donate international aid, for example, Cuba, and China. The United States links aid to democratic reforms and human rights, although restricting support for reproductive rights since 2001.Bilateral agencies functioning in India are USAID for malaria eradication, Family planning & Education; SIDA for RNTCP, DANIDA for NBCP.

Colombo Plan

This was conceived at a meeting of Common wealth Foreign Ministers in Colombo in 1950. It consists of a group of 20 developing countries in South and South East Asia and 6 developed countries (USA, UK, Canada, Australia, New Zealand and Japan). The assistance to member countries is mainly aimed at agricultural and industrial development. Some funds are earmarked for health also. Health activities in India related to Colombo Plan have included supply of cobalt therapy units by Canada and establishment of the All India Institute of Medical Sciences at New Delhi through financial assistance from New

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Zealand. Many fellowships for training of health personnel have also been provided from time to time.

United States Agency for International Development (USAID)

The United States Agency for International Development, established in 1961, provides assistance to a large number of countries in the world. It has supported several health programs in India, including control of malaria and other communicable diseases, water supply and sanitation, family planning, nutrition and medical and nursing education. Prior to establishment of USAID, the US assistance was channelled through the Technical Cooperation Mission.

Two other US agencies providing assistance are:

1. Public Law 480 (Food for Peace) Program
2. US Export Import Bank.

USAID is currently providing massive assistance to AIDS/HIV control in India. The APAC Project in Tamil Nadu and the AVERT project in Maharashtra are funded by USAID through the National AIDS Control Organization.

Danida

Danish International Development Assistance is funded by the Government of Denmark. It has supported many major activities in India in relation to health and education. DANIDA is currently supporting three major health programs in India—DANLEP (Danida Assisted National Leprosy Eradication Program) was launched in 4 districts in three State of Madhya Pradesh, Orissa and Tamil Nadu in 1986. DANLEPs multipronged strategy consists of infrastructural support, health education, human resource development, program monitoring and prevention and care of deformities; DANPCB (Danida Assisted National Program for Control of Blindness) which was initiated in 1978. It is currently in the third phase of extension. In the first phase primary health centre infrastructure strengthening was the objective while in the second phase human resource development and decentralization by setting up District Blindness Control Societies was the major input. The third phase is continuing the gains of the earlier two phases and it is proposed to set up a National Eye Care Resource Cant RE through this assistance; DANTB (Danida Assisted Revised National Tuberculosis Control Program) was initiated in 1996.

Phase I end in 2001 but DANIDA has already committed to support a second phase for a further period of five years.

DFID

The Department for International Development is the organization channelizing British government assistance. The main objective of DFID is the global effort to eliminate world poverty in the 21st century. These targets include halving the proportion of people living in extreme poverty by 2015. The other objectives of DFID include achieving universal primary education by2015, making progress towards gender equality and empowering women by eliminating disparities in primary and secondary education by 2005, reducing infants and child mortality rates by two-thirds by 2015, reduce maternal mortality ratios by 3/4th by 2015 and implement national strategies for sustainable development by 2005. DFID activities are focused in4 States in India—Madhya Pradesh, Andhra Pradesh, Orissa and West Bengal. In the health sector DFID is supporting reproductive health services, control of HIV/AIDS, tuberculosis control, community eye care and polio eradication.

Other bilateral government agencies active in India are the Swedish, Canadian, and Norwegian Agencies for International Development.

International Nongovernmental Organizations (NGOs) are increasingly active in development work as the inadequacies of bilateral and multilateral responses become more apparent. Sometimes known as "people to people" aid, their activities are mostly specific, for example, targeting trachoma, and cataract, while some are general, for

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example, aid for orphans. Supported mainly by voluntary subscriptions or donations, some NGOs also act under contract to governments or other agencies.

The largest NGO is the International Red Cross and Red Crescent movement, which has national counterparts within most countries. It is mandated under the Geneva Conventions to assist prisoners and civilians in armed conflicts, including visiting detainees and enabling them to communicate with the outside world, setting up surgical hospitals and emergency teams, rehabilitation of war-disabled persons, and providing independent information on prisoners and war victims.

Other well-known international NGOs are Oxford Famine Relief (OXFAM), CARE International, Save the Children International Alliance, and World Vision. Medecins Sans Frontieres (MSF, Doctors without Borders) was recently awarded the Nobel Peace prize (1999). Founded in France in 1971, MSF provides health aid to war victims, and assists in other health disasters and development initiatives.

National Health Policy

Policy is a system, which provides the logical framework and rationality of decision making for the achievement of intended objectives.

- It is the statement that guide and provide discretion within limited boundaries.
- Policy sets priorities and guide resources allocations. Public health policy improves conditions under which people live: Secure, safe, adequate and sustainable livelihood
- Lifestyle and environments, including housing.
- Education, nutrition, childcare, reproduction health.
- Transportation, information and communication, necessary community and personal social and health services.
- Policy adequacy may be measured by its impact on population health.

First formal NHP was formulated in 1983 and since then there have been marked changes in the determinant factors relating to the health sector.

Objective

1. To achieve an acceptable standard of good health amongst the general population of the country.
2. To increase access to the decentralizing public health system by establishing new infrastructure in deficient areas and, by upgrading the infrastructure in existing institutions.
3. To ensuring a more equitable access to health services across the social and geographical expanse of the country.
4. To enhance the contribution of the private sector in providing health service for the population group which can afford to pay for services.
5. To increase the aggregate public health investment through a substantially increased by the central government.
6. To strengthen the capacity of the public health administration at the state level to render effective service delivery.
7. To rationalize use of drugs within the allopathic system.
8. To increase access to tried and tested systems of traditional Medicine.

Goals to be Achieved by 2000-2015-2003 – Enactment of legislation for regulating minimum standard in clinical Establishment / Medical institution

2005 –

- Eradication of Polio & Yaws
- Elimination Leprosy
- Increase State Sector health spending from 5.5% to 7% to of the budget.
- Establishment of an integrated system of surveillance, National Health Accounts and Health Statistics
- 1% of the total budget for Medical Research
- Decentralization of implementation of public health program

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2007- Achieve of Zero level growth of HIV/AIDS

2010-

- Elimination of Kala- Azar
- Reduction of mortality by 50% on account of Tuberculosis, Malaria, Other vector & water borne Diseases
- Reduce prevalence of Blindness to 0.5%
- Reduction of IMR to 30/1000 live births & MMR to100/ Lakh live births
- Increase utilization of public health facilities from current level of <20% to > 75%
- Increase health expenditure by government from the existing 0.9% to 2.0% of GDP
- Increase share of Central grants to constitute at least 25% of total health spending
- Further increase of State sector Health spending from 7% to 8%
- 2% of the total health budget for medical Research
- 2015- Elimination lymphatic Filariasis.

Contribution of the World Health Organization to The Global Acceptance of Ayurveda

WHO recognized Alma Ata's role in healthcare sectors, emphasizing traditional, alternative, and complementary systems for "Health for All." WHO's Traditional Medicine Program addresses global perspectives. Traditional medicine is holistic healthcare based on indigenous theories, beliefs, and experiences passed down through generations, promoting health maintenance and disease treatment. Ayurveda [traditional medicine (TRM) of India as per WHO], the holistic science of medicine, is gaining global recognition due to its qualitative strength, essential health elements, and important clues for consistent life functioning. It focuses on managing lifestyle disorders and is recognized for its therapeutic value in wellness centres.

WHO is consistently working in this area of service to mankind under the authority of the United Nations Organisation to promote health programmes of every member country. This assessment provides a futuristic overview of WHO's attempts to enhance the Ayurvedic medical system.

Strengthening of Traditional Medicine By World Health Organization

WHO coordinates with global health authorities, providing leadership, shaping research agendas, setting norms, articulating evidence-based policy options, providing technical support, and monitoring trends, including TRM.

Specific strategies of WHO for promotion of TRM

01- Rules for regulation of Herbal Medicine- WHO emphasizes proper rules and regulations for TM practice in member countries and global accreditation in geographical part since human civilization.

02- Criteria for classification of Herbal Medicines- WHO guidelines classify herbal medicines into four categories based on origin, evolution, and current usage, allowing for a constructive examination of safety, efficacy, and quality.

Category 1: Indigenous herbal medicines

Category 2: Herbal medicines in systems

Category 3: Modified herbal medicines

Category 4: Imported products with a herbal medicine base

03- Scheme for standardisation of Herbal Medicine- WHO emphasizes the shared responsibility of manufacturers and regulatory bodies for quality assurance of herbal medicinal products, requiring guidelines, evaluation, and post-marketing compliance with specifications and GMP.

04- Reason for rational use of Herbal Medicine- Rational use of medicines is crucial in India, where disparities in availability exist between cities and villages. However, the concept has not fully permeated healthcare providers and the public, causing widespread irrationality in medicine prescriptions.

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05- Projection of pharmacovigilance programme for Herbal Medicine- WHO recommends including herbal medicines in national pharmacovigilance programs, but technical issues and Ayurvedic principles must be addressed for effective monitoring. Pharmacovigilance programs should identify challenges, propose measures, and focus on reporting adverse reactions and causality analysis.

06- Commencement of consumer guidelines of Herbal Medicines- WHO country office agreed to sponsor a short-term project meant to prepare consumer guidelines for appropriate use of Ayurvedic medicines on recommendations of the Department of AYUSH, Government of India.

07- Fellowship at Collaborative Centres- WHO emphasizes human resources in Traditional Medicine (TM) needing multidisciplinary knowledge. Collaborating with institutions, a significant number of health professionals and administrators are sponsored annually.

WHO is consistently working in this area of service to mankind under the authority of the United Nations Organisation to promote health programmes of every member country. This assessment provides a futuristic overview of WHO's attempts to enhance the Ayurvedic medical system.

Traditional, alternative, and complementary medicine systems dominate global healthcare, but understanding their dynamism is crucial for developing countries with limited resources. Exploring their scope can significantly improve healthcare options. The global herbal market is expected to reach $5 trillion by 2050, with Europe and the US being major markets with 41% and 20% market shares, respectively. This growth aligns with the global resurgence of Ayurveda, similar to the domestic market.

MCQ on World Health Organization and International Health Agencies

1. World Health Organization (WHO) recently urged South-East Asian countries to take urgent measures against which disease?
   a) Polio b) Measles
   c) Tuberculosis d) Pneumonia
2. Which of the following is / are correct statements about World Health Assembly?
   1. It is the key decision-making body under World Health Organization
   2. It is composed of technically qualified individuals in the health field designated by the Member Countries
   a) Select the correct option from the codes given below:
   a) Only 1 b) Only 1
   c) Both 1 & 2 d) Neither 1 nor 2
3. In January 2022, which country took over the G7 presidency
   a) Netherlands b) Germany
   c) Austria d) France
4. Which of following country is not a member of SAARC
   a) Nepal b) Maldives
   c) China d) Afghanistan
5. Which of following is not an official language of the United Nations
   a) Spanish b) French
   c) Arabic d) Turkish
6. Who is the head of UNICEF
   a) Tedros Adhanom b) Guy Ryder
   c) Jose Graniano Silva
   d) Henrieeta H Fore
7. Which country is no member of G7
   a) Russia b) Germany
   c) Italy d) Britain
8. The organization provide long-term humanitarian and developmental assistance to children and mothers in developing countries is
   a) UNICEF b) UNESCO
   c) World Bank d) CGS UN
9. The United Nations Children's Fund (UNICEF) was created by
   a) United Nations Development Council

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b) United Nations Development Group
c) United Nations Security Council
d) United Nations General Assembly

10. First chairman and founder of 'UNICEF' was
a) William Randal Cremer
b) Fredrik Bajer
c) Ludvik Rajchman
d) Anthony Lake

11. The United Nations Children's Fund (UNICEF) was founded in
a) 11 May, 1946 b) 11 April, 1946
c) 11 January, 1945 d) 11 December, 1946

12. Headquarter of 'UNICEF' is located in
a) Washington b) New York City
c) Geneva d) Nairobi

13. Which of following organization is working for people's education in world
a) UNICEF b) DANIDA
c) UNESCO d) RED CROSS

14. Which of the following statements is incorrect about WHO?
a) Objective of WHO is attainment by all people of the highest level of health
b) Headquarters of WHO are located in Geneva
c) WHO is a non-specialized, political agency of United Nations
d) World Health Assembly is the 'Health Parliament' and supreme governing body of the organization

15. Match the following health agencies and the location of their headquarters:
Health agency Headquarters
1. WHO I – Rome, Italy
2. UNICEF–II – New York, USA
3. FAO III – Geneva, Switzerland
a) A – I, B – II, C – III
b) A – III, B – II, C – I
c) A – III, B – I, C – II
d) A – I, B – III, C – II

16. WHO was established in:
a) 1945 b) 1948
c) 1950 d) 1956

17. International Red Cross is based in:
a) Geneva b) New York
c) New Delhi d) Rome

18. In UNICEF's GOBI Campaign, 'O' stands for:
a) Oral Contraceptives
b) Oral Rehydration Therapy
c) Obesity
d) Occupational hazards

19. Members of southeast Asia of WHO are:
a) Japan b) Afghanistan
c) India d) Pakistan

20. Highest funding for reproductive health is by:
a) UNFPA b) UNICEF
c) ILO d) WHO

21. WHO formation day is:
a) 5 May b) 7 April
c) 10 June d) 10 July

22. UNICEF provides all except:
a) Child nutrition
b) Child health education
c) Immunization
d) Family planning

23. World bank gives loans for:
a) For economic growth
b) Cobalt therapy of radiotherapy department
c) Purchase of microscope for tuberculosis investigation
d) To change of the social justice

24. All of the following activities of Junior Red Cross except:
a) Military hospital worker
b) Village uplift
c) Prevent epidemic work
d) Any of the above

25. Headquarters of UNICEF is at:
a) Geneva b) New york
c) Rome d) New Delhi

26. UNDP works as:
a) The main source of funds for technical assistance
b) The main source of funds for child health

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c) The source of funds for research and development
d) Education source for developing countries

27. All of the following organization have their head quarter at Geneva except:
a) UNICEF b) WHO
c) ILO d) None

28. All of the following organizations have their head quarter at Geneva except:
a) UNICEF
b) WHO
c) ILO
d) International red cross

29. Head quarter of WHO is at:
a) New York b) Geneva
c) London d) New Delhi

30. All disease are included in internationally notifiable disease except:
a) Plague b) Cholera
c) Yellow fever d) TB

31. Diseases under International Surveillance includes all except:
a) Louse borne typhus fever
b) Relapsing fever
c) Paralytic polio
d) Yellow fever

32. Tropical diseases targeted for research and training by WHO include all except:
a) Trypanosomiasis b) Filariasis
c) Schistosomiasis d) Onchocerciasis

33. Finger Print Bureau was first established in:
a) England b) China
c) India d) Singapore

34. Emporiatrics refers to study of:
a) Occupational disease
b) Air pollution
c) Environmental factor
d) Health of travelers

35. Quarantine was originally introduced as a protection against:
a) Plague b) Tuberculosis
c) AIDS d) Malaria

36. Disease excluded and re-included from International Health Regulations till date is:
a) Smallpox b) Guinea worm
c) Typhoid d) HIV/AIDS

37. World Health Day is observed every year on:
a) January 11 b) April 7
c) June 5 d) December 1

38. Only certificate of vaccination required for international travel is:
a) Hepatitis B b) BCG
c) Tetanus d) Yellow fever

39. Contribution of Germany to pubic health:
a) Germ theory
b) Pasteurization
c) Quarantine ship
d) Compulsory sickness benefit

40. All of the following are most important and potential agents which can be used for Bio-terrorism except:
a) Smallpox b) Plague
c) Botulism d) Tuberculosis

41. Which of the following is not true about World Health Report 2008?
a) Service delivery reforms
b) Leadership reforms
c) Public Policy reforms
d) Economic reforms

42. For studying the complete amino acid sequence of two polypeptide chains of Insulin, Nobel Prize was awarded to:
a) Fredreich Sanger
b) Banting and Macleod
c) Paul Muller
d) Alexander Fleming

43. Bioterrorism group-A agent is?
a) Q fever b) Typhus fever
c) Anthrax d) Brucellosis

44. Maximum damage to Napoleon's army during his march to Moscow was done by:
a) Typhus b) Plague
c) Diarrhea d) Typhoid

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45. Emporiatrics deals with the health of:
    a) Farmers b) Travellers
    c) Industrial workers d) Mine workers

Answers MCQ On World Health Organization and International Health Agencies

1. Ans. (b) Measles
2. Ans. (a) Only 1
3. Ans. (b) Germany
4. Ans. (c) China
5. Ans. (d) Turkish
6. Ans. (d) Henrieeta H Fore
7. Ans. (a) Russia
8. Ans. (a) UNICEF
9. Ans. (d) United Nations General Assembly
10. Ans. (b) Fredrik Bajer
11. Ans. (d) 11 December 1946
12. Ans. (b)New York City
13. Ans. (c) UNESCO
14. Ans. (c) WHO is a non-specialized, political agency of United Nations
15. Ans. (b) A – III, B – II, C – I
16. Ans. (b) 1948
17. Ans. (a) Geneva
18. Ans. (b) Oral Rehydration Therapy
19. Ans. (c) India
20. Ans. (a) UNFPA
21. Ans. (b) 7 April
22. Ans. (d) Family planning
23. Ans. (a) For economic growth
24. Ans. (a) Military hospital worker
25. Ans. (b) New york
26. Ans. (a) The main source of funds for technical assistance
27. Ans. (a) UNICEF
28. Ans. (a) UNICEF
29. Ans. (b) Geneva
30. Ans. (d) TB
31. Ans. (d) Yellow fever
32. Ans. (d) Onchocerciasis
33. Ans. (c) India
34. Ans. (d) Health of travelers
35. Ans. (a) Plague
36. Ans. (a) Small pox
37. Ans. (b) April 7
38. Ans. (d) Yellow fever
39. Ans. (d) Compulsory sickness insurance
40. Ans. (d) Tuberculosis
41. Ans. (d) Economic reforms International Health
42. Ans. (a) Fredreich Sanger
43. Ans. (c) Anthrax
44. Ans. (a) Typhus
45. Ans. (b) Travellers

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Syllabus

Definition of Vital Statistics. Sources of Vital statistics. Fertility, Morbidity and Mortality rates. Registration of Birth and Death Act, 1969

Learning objectives

1. Define Vital Statistics. Enumerate the sources of Vital statistics
2. Describe Fertility, Morbidity and Mortality rates
3. Understanding of Registration of Birth and Death Act, 1969

Total – 2 hours (Lecture :1 hours, Non lecture: 1 hours)
MCQ- Yes- SAQ (5 Marks)- Yes- LAQ (10 Marks)- No

Definition of Vital Statistics

- Vital statistics are conventionally numerical records of marriage births, sickness, and death by which the health and growth of community may be studied.
- It is a branch of biometry deals with data and law of human mortality, morbidity & demography.

Purpose

1. **Community Health:** To describe the level of community health, to diagnose community illness & to discover solutions to health problems.
2. **Administrative purpose:** It provides clues for administrative action to create administrative standards of health activities.
3. **Health programmed organization:** To determine success or failure of specific health programmed or undertake overall evaluation of public health work.
4. **Legislation purpose:** To promote health legislation at local, state & national level.
5. **Government Purpose:** To develop, policies, procedure at state and central level.

Uses-

1. To evaluate the impact of various National Health Programmes.
2. To plan for better future measures of disease control.
3. To explain the hereditary nature of the disease.
4. To plan and evaluate economic and social development.
5. It is a primary tool in research activities.
6. To determine the health status of individual.
7. To compare the health status of individual one nation with others.

Sources of Vital Statistics

1. **Civil Registration System:** It is defined as the continuous permanent and compulsory recording of the occurrence of vital events like live births, deaths, fetal deaths, marriages, divorces, as well as annulments, judicial separation, adoption. Civil registration is performed under a law and regulation so as to provide legal basis to the records and certificate made from system.
2. **National Sample Survey:** The data collected from the census are not very reliable and

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available only once in 10 years. In absence of reliable data from the civil registration system (SRS), the need for reliable statistics at national and state levels is being met through sample surveys launched from time to time.

3. **Sample Registration System:** In this system, there is continuous enumeration of births and deaths in a sample of villages/urban blocks by a resident part-time enumerator and then an independent six-monthly retrospective survey by a full-time supervisor.
4. **Health Surveys:** A few important sources for demographic data have emerged. These are National Family Health Surveys (NFHS) and the District Levels Household Surveys (DLHS) conducted for evaluation of reproductive and child health programmes. NFHS provide estimates of fertility, child mortality and a no. of fertility, child mortality and a no. of health parameters relating to infants and children at state level. The DLHS provide information at the district level on a no. of indicators relating to child health, reproductive health problems and quality of services availability to them.

Fertility, Morbidity and Mortality Rates

Live birth: Live birth is the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy, which, after such separation, breathes or shows any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles. Whether or not the umbilical cord has been cut or the placenta is, attached, each product of such a birth is considered live-born. It may be mentioned that under the Indian "Registration of Births and Deaths Act, 1969" birth includes both live birth and stillbirth.

Fetal death: Fetal death is death prior to the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy.

The death is indicated by the fact that, after such separation, the fetus does not breathe or show any other evidence of life, such as beating of the heart, pulsation of the umbilical cord or definite movement of voluntary muscles.

Stillbirth: It is synonymous with late fetal death, i.e. twenty-eight completed wise of gestation.

Immaturity (prematurity): In international classification of disease, an immature infant is a live born infant with a birth weight of 2500 g (5.5 Ibs) or less. In some countries a live-born infant with a period of gestation less than 37 weeks is specified as 'premature' regardless of weight. Such premature infant may be considered as 'immature' in International Classification.

Death: "Death is the permanent disappearance of all evidence of life at any time after live birth has taken place" (postnatal cessation of vital functions without capability of resuscitation).

Infant deaths: Deaths under one year of age.

Neonatal deaths: Deaths occurring under 28 days of age.

Perinatal deaths: Deaths occurring after 28 weeks of fetal life and within 7 days after birth. It is often difficult to know the correct fetal age. In such situation, fetal weight of 1000 gm is considered to represent gestational age of 28 weeks, as suggested by the Ninth Revision (1975) of International Classification of Diseases. If both gestational age and birth weight are unknown, then a body length (crown to heel) of 35 cm is taken as equivalent to 28 weeks gestational age.

Maternal deaths: Deaths associated with complications of pregnancy, childbirth and puerperium.

$$\text{Crude Birth Rate} = \frac{\text{Birth Rates Number of live births which occurred in the population of a given geographical area during a given year}}{\text{Mid-year total population of the given geographic area during the same year}} \times 1000$$

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Morbidity rates

Incidence: It means occurrence of new cases due to any particular disease, during a specified period of time such as week, month or year, usually a calendar year.

Prevalence: Includes both old and new cases that existed during the defined period.

Mortality rates- A death rate. There are a number of different types of mortality rates as, for examples, the following:

- **The fetal mortality rate:** The ratio of fetal deaths to the sum of the births (the live births + the fetal deaths) in that year.
- **The infant mortality rate:** The number of children dying under a year of age divided by the number of live births that year.
- **The maternal mortality rate:** The number of maternal deaths related to childbearing divided by the number of live births (or by the number of live births + fetal deaths) in that year.

Fertility rates- The definitions of various rates are given below. The respective values are given in age of fertility is generally taken as 15 to 49 years. However, some people prefer to regard the fertile period as 15 to 45 years.12

General fertility rate (GFR): Number of live births per 1000 women in the reproductive age group (15-49 years) in a given year.

General marital fertility rate (GMFR): Number of live births per 1000 married women in the reproductive age-group (15-49 years) in a given year.

Total fertility rate (TFR) : Average number of children that would be born to a woman if she experiences the current fertility pattern throughout her reproductive span (15-49 years).

Total marital fertility rate (TMFR): Average number of children that would be born to a married woman if she experiences the current fertility pattern throughout her reproductive span, i.e. 15 to 49 years. (The TFR serves an estimate of the average number of children per family).

Gross reproduction rate (GRR): Average number of daughters that would be born to a woman if she experiences the current fertility pattern throughout her reproductive span (15-49 years).

Net production rate (NR): Average number of daughters that would be born to a woman if she experiences the current fertility and mortality patterns throughout her reproductive span (15-49 years).

Age-specific fertility rate: Number of live births in a year to 1000 women in any specified age group.

Registration of Birth And Death ACT, 1969

An Act to provide for the regulation of registration of births and deaths and for matters connected therewith

Total five chapters-

Chapter I- Preliminary

Chapter II- Registration establishment

Chapter III - Registration of births and deaths

Chapter IV- Maintenance of records and statistics

Chapter V- Miscellaneous

This act may call the registration of births and death Act, 1969.

Chapter I- Preliminary

Birth means live-birth or still-birth.

Death means the permanent disappearance of all evidence of life at any time after live-birth has taken place.

Foetal Death means absence of all evidence of life prior to the complete expulsion or extraction from its mother of a product of conception irrespective of the duration of pregnancy.

live-birth means the complete expulsion of extraction from its mother of a product of conception, irrespective of the duration of pregnancy, which, after such expulsion or extraction, breathes or shows any other evidence of life, and each product of such birth is considered live-born.

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Still-Birth means foetal death where a product of conception has attained at least the prescribed period of gestation.

Chapter II- Registration establishment

Registrar- General, India The Central Government may appoint Registrar-General, India.

Chief Registrar - The State Government may appoint a Chief Registrar for the State.

Registration divisions - The State Government may prescribe different rules for different registration divisions.

District Registrar- The State Government may appoint a District Registrar for each revenue district and such number of Additional District Registrars.

Registrars-The State Government may appoint a Registrar for each local area comprising the area within the jurisdiction of a municipality, panchayat or other local authority or any other area or a combination of any two or more of them:

Provided that the State Government may appoint in the case of a municipality, panchayat, or other local authority, any officer or other employee thereof as a Registrar. Every Registrar shall, without fee or reward, enter in the register maintained for the purpose all information given to him under section 8 or section 9 and shall also take steps to inform himself carefully of every birth and of every death which takes place in his jurisdiction and to ascertain and register the particulars required to be registered.

Every Registrar shall attend his office for the purpose of registering births and deaths on such days and at such hours as the Chief Registrar may direct and shall cause to be placed in some conspicuous place on or near the outer door of the office of the Registrar a board bearing, in the local language, his name with the addition of Registrar of Births and Deaths for the local area for which he is appointed, and the days and hours of his attendance.

The Registrar may, with the prior approval of the Chief Registrar, appoint Sub-Registrars and assign to them any or all of his powers and duties in relation to specified areas within his jurisdiction.

Chapter III - Registration of births and deaths

Section-8 :- Persons required to register births and deaths:

The Head of the House or, Head of the Household, Nearest relative of the head present in the house, the Oldest Adult Male

- With respect to Births and Deaths in a hospital, health centre, maternity or nursing home or other like institution, the Medical Officer in charge or his delegatee
- With respect to Births and Deaths in a jail, the Jailor in charge;
- With respect to Births and Deaths in choultry, chattram, hostel, dharmasala, boarding-house, lodging-house, tavern, barrack, toddy shop or place of public resort, the person In- Charge thereof
- With respect to any new-born child or dead body found deserted in a public place, the Headman or other Corresponding Officer of the village in the case of a village and the officer in- charge of the local police station elsewhere:

Section-9 :- Special provision regarding births and deaths in a plantation In the case of births and deaths in a plantation, the Superintendent of the Plantation shall give or cause to be given to the Registrar the information.

Section-10 - Duty of certain persons to notify births and deaths and to certify cause of death. It shall be the duty of-

1. Midwife or any other medical or health attendant at a birth or death
2. Keeper or the owner of a place set apart for the disposal of dead bodies or any person required by a local authority to be present at such place
3. Registrar may obtain certificate as to the cause of death or information giver may collect death certificate from a medical practitioner, the medical practitioner shall and the certificate shall be received and delivered by such person

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to the Registrar at the time of giving information.

Section-11 - Informant to sign the register- Every person who has orally given to the Registrar any information required shall write in the register maintained in this behalf, his name, description and place of abode, and, if he cannot write, shall put his thumb mark in the register against his name, description and place of abode, the particulars being in such a case entered by the Registrar.

Section-12 - Extracts of registration entries to be given to informant-The Registrar shall, as soon as the registration of a birth or death has been completed, give, free of charge (or at a prescribed fee) to the person who gives information under section 8 or section 9 and extract of the prescribed particulars under his hand from the register relating to such birth or death.

Section-13 :- Delayed registration of births and deaths - Any birth or death of which information is given to the Registrar after the expiry of the period specified therefor, but within 30 days of its occurrence, shall be registered on payment of such late fee as may be prescribed. Any birth or death of which delayed information is given to the Registrar after thirty days but within one year of its occurrence shall be registered only with the written permission of the prescribed authority and on payment of the prescribed fee and the production of an affidavit made before a notary public or any other officer authorised in this behalf by the State Government. Any birth or death which has not been registered within one year of its occurrence, shall be registered only on an order made by a magistrate of the first class or a Presidency Magistrate after verifying the correctness of the birth or death and on payment of the prescribed fee.

Section-14:- Registration of name of child - Where the birth of - any child has been registered without a name, the parent or guardian of such child shall within the prescribed period give information regarding the name of the child to the Registrar either orally or in writing and thereupon the Registrar shall enter such name in the register and initial and date the entry.

Section-15 - Correction or cancellation of entry in the register of births and deaths - To the satisfaction of the -

Registrar that any entry of a birth or death in any register is erroneous in form or substance, or has been fraudulently or improperly made, he may, correct the error or cancel the entry by suitable entry in the margin, without any alteration of the original entry, and shall sign the marginal entry and add thereto the date of the correction or cancellation.

Chapter IV- Maintenance of records and statistics

Section-16- Every Registrar shall keep in the prescribed form a Register of Births and Deaths. Copy of such forms of certifcate in the local language shall be posted in some conspicuous place on or near the outer door of the office of every Registrar.

Section-17 - Search of births and deaths register.- Any person may search for any entry in a register of births and deaths; and obtain an extract from such register relating to any birth or death, no extract relating to any death shall disclose the particulars regarding the cause of death as entered in the register. All extracts given shall be admissible in evidence as per Indian Evidence Act, 1872 and shall be proof of birth or death

Inspection rules, returns & publication of statistical report on the regd. births & deaths during the year at such intervals & in form.

Chapter V- Miscellaneous

Section-20:- Special provision as to registration of births and deaths of citizens outside India: Information received of Births & deaths of citizens of India outside India by Indian Consulates shall be information and they may issue Birth & Death certificate. In the case of any child born outside India and if the parents of the child return to India they may, at any time within sixty days from the date of the arrival of the child in India, get the birth of the child registered (as if the child was born in India)

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Section-21 - Power of Registrar to obtain information regarding birth or death- The Registrar may either orally or in writing require any person to furnish any information within his knowledge in connection with a birth or death in the locality within which such person resides and that person shall be bound to comply with such requisition.

Section-23- Penalties -any person who- Fails without reasonable cause to give any information which it is his duty to give under any of the provisions or gives or causes to be given, for the purpose of being inserted in any register of births and deaths, any information which he knows or believes to be false regarding any of the particulars required to be known and registered; or refuses to write his name, description and place of abode or to put his thumb mark in the register shall be punishable with fine which may extend to fifty rupees.

Any Registrar or Sub-Registrar who neglects or refuses, without reasonable cause, to register any birth or death occurring in his jurisdiction or to submit any returns as required shall be punishable with fine which may extend to fifty rupees.

Section-23: - Penalties.- Any person who- Any medical practitioner who neglects or refuses to issue a certificate and any person who neglects or refuses to deliver such certificate shall be punishable with fine which may extend to fifty rupees.

Any person who, without reasonable cause, contravenes any provision of this Act for the contravention of which no penalty is provided for in this section shall be punishable with fine which may extend to ten rupees.

Registrars and Sub-Registrars to be deemed public servants.— They are public servants within the meaning of section 21 of the Indian Penal Code (45 of 1860).

Protection of action taken in good faith. Act not to be in derogation of Act 6 of 1886

Power to make rules: forms of registers, period certificate as to cause of death, extract, search and the fees, returns and the statistical report, the custody, production and transfer of the registers and other records, the correction of errors and the cancellation of entries in the register of births and deaths

Power to remove difficulty- If any difficulty the State may, with the approval of the Central Govt. by order make such provisions or give such directions not inconsistent with the provisions of this Act as appears to the State Government to be necessary or expedient for removing the difficulty. No order after the expiration of two years from the date on which this Act comes into force.

Section-23: - Penalties.- Any person who-

- Any medical practitioner who neglects or refuses to issue a certificate and any person who neglects or refuses to deliver such certificate shall be punishable with fine which may extend to fifty rupees.
- Any person who, without reasonable cause, contravenes any provision of this Act for the contravention of which no penalty is provided for in this section shall be punishable with fine which may extend to ten rupees.
- Registrars and Sub-Registrars to be deemed public servants.- They are public servants within the meaning of section 21 of the Indian Penal Code (45 of 1860).

Purpose of Registration of Birth and Death ACT, 1969

1. It has been proposed to make birth certificates a mandatory document for almost every sphere of life - admission in educational institutions, inclusion in the voter list, appointment in Central and State government jobs, issue of driving licence and passport.
2. It shall be mandatory for hospitals and medical institutions to provide a copy of all death certificates, stating the cause of death, to the local registrar apart from the relative of the deceased.
3. The draft amendments would enable the Registrar General of India (RGI) under the Ministry of Home Affairs (MHA) to "maintain

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a database of registered birth and deaths at the national level".

4. The birth and death database at the national level that will be available with the RGI may be used to update the Population Register, the Electoral Register, and the Aadhar, ration card, passport and driving licence databases.

MCQ on Vitas Statistics

1. Which of the following is best to compare the vital statistics of countries?
   a) Crude death and birth rates
   b) Age standardized death rate
   c) Age specific death rate
   d) Proportional mortality rate
2. Vital statistics include the following, except
   a) Birth rate
   b) Education rate
   c) Morbidity and mortality statistics
   d) Life expectancy
3. Vital statics is mainly concerned with
   a) Births b) Deaths
   c) Marriages d) All the above
4. The data on births, deaths, marriage & divorce called
   a) Mortality b) Morbidity
   c) Vital statistics d) Prevalence
5. Vital statistics are important for researchers, epidemiologist, health planners, and other health professionals to
   a) Determine the health status of a community.
   b) Decide how best to provide a health service.
   c) Plan a public health program.
   d) All are true
6. Vital statistics are parameters of health care which include all these except
   a) Maternal mortality rate, ratio
   b) Prenatal mortality (PNM)
   c) Neonatal mortality (NNM)
   d) Crude death rate.
7. The annual number of female deaths per 100,000 live births from any cause related to or aggravated by pregnancy or its management (excluding accidental or incidental causes) is
   a) Maternal Mortality Rate
   b) Infant mortality rate.
   c) Crude death rate.
   d) Peri-natal mortality rate.
8. Newborn breathes at birth spontaneously or shows any other sign of life as hear the beat or definite spontaneous of voluntary muscles, but the absence of all these signs means
   a) Death on table. b) Still birth
   c) Infant mortality. d) Neonatal mortality.
9. Death that result from previously existing disease, or a disease, that developed during pregnancy, labour or puerperium, but which aggravated by maternal physiological adaptation to pregnancy
   a) Prevalence
   b) Attack rate
   c) Cause specific death rate
   d) Indirect mortality rate
10. The number of live births per 1,000 people in a population in a year is known as
    a) Fecundity
    b) Fertility
    c) Crude birth rate
    d) Basic demographic equation
11. An enumeration or counting of a population is referred to as
    a) Vital statistics b) Census
    c) Fertility rate c d) Growth rate
12. Records of births, deaths, marriages, and divorces, gathered through a registration system maintained by governmental units, are referred to as
    a) Census b) Demography
    c) Vital statistics d) None of the above

Answers of MCQ on Vitas Statistics

1. Ans. (b) Age standardized death rate

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2. Ans. (b) Education rate
3. Ans. (d) All the above
4. Ans (c) Vital statistics
5. Ans. (d) All the above
6. Ans. (d) Crude death rate.
7. Ans. (a) Maternal Mortality Rate
8. Ans. (b) Still birth
9. Ans. (d) Indirect mortality rate
10. Ans. (c) Crude birth rate
11. Ans. (c) Crude birth rate
12. Ans. (b) Census
13. Ans. (d)Vital statistics

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Syllabus

Health administration including AYUSH at the Central, State, District, and Village levels.

Learning objectives

1. Describe the health administration including AYUSH at the Central, State, District, and Village levels

Total – 3 hours (Lecture :2 hours, Non lecture: 1 hours)
MCQ- Yes- SAQ (5 Marks)- Yes- LAQ (10 Marks)- No

The health system in India has three links

1. Central 2. State 3. District or Local

India is a union of 28 states and 8 union territories. The states are independent in matter relating to the delivery of health care to the people.

Each state has its own system of health care delivery. The central responsibility consists mainly of policy making, planning, guiding, assisting, evaluating and coordinating, the work of state health ministers. So that health services cover every part of country and no state lags behind for these services.

At the Central –

Official Organ

- Union Ministry of Health and Family
- Director General of Health Service
- Central council of Health and Family

Union Ministry of Health and Family Welfare

Union ministry of health and family welfare
↓
Headed by cabinet Minister
↓
Ministre of State

- Deputy Health Minister
- Department of family welfare

Secretary to the Gov. of India (Executive head)
↓
Joint Secretary
Administrative staff
↓
Directorate general of health services
↓
Subordinate officer

Secretary of the Govt of India
↓
Additional secretary
Commissioner
↓
One joint secretary

Function

Sr. No.	Union list	Concurrent list
1.	International health relations and administration of port quarantine	Prevention of extension of communicable diseases from one unit to another
2.	Administration of central institutes	Prevention of adulteration of foodstuffs
3.	Promotion of research through research centres	Control of drugs and poisons
4.	Regulation and development of medical pharmaceutical, dental and nursing standards	Vital statistics
5.	Establishment and maintenance of drug standards	Labour welfare

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6.	Census and collection and publication of other statistical data	Ports other than major
7.	Immigration and emigration	Economic and social planning
8.	Regulation of labour in the working of mines and oil fields	Population control and family planning.
9.	Coordination with States and with other ministries for promotion of health.	

Directorate general of health services – Principal advisor in both medical and public health matter.

DGHS
↓
Additional Director General of Health Services
↓
Team of Deputies
↓
Administrative Staff
↓
Directorates - Three main units

Medical care and hospital | Public Health | General Administration

Function of DGHS

General- survey, planning, co-ordination, programming, and improvement of all health in the country.

Specific-

1. International health relations
2. Control of drug standard.
3. To run the medical store depot.
4. Post graduate training in national institutions.
5. Education of some medical colleges
6. Medical research
7. Central government health scheme
8. National health programme
9. Central health education bureau
10. Health intelligence
11. National medical library

Central council of health-

Chairman – Union health minister

Members – State health ministers

Function-

1. To consider and recommend broad outlines of the health policy
2. To make proposals for legislation in fields of medical and public health.
3. To make recommendations to the central government regarding the health.
4. To established any organization with appropriate functions for promoting and maintain cooperation between central and state health administrations.

II- At the State Level

The state health administration was started in the year 1919.

The state list which become the responsibility of the state included

- Provision of medical care
- Preventive health services
- Piligrim within the state

State ministry of health and family welfare-

Headed - Cabinet minister and deputy minister. (Political head)

Responsibility - formulating policies

Monitoring the implementation of these policies and programmes.

State health directorate and family welfare-

Principle advisor in matters relating to medicine and public health

Assisted by joint director, regional joint director and assistant directors.

III- At The District Level

Principal unit of administration in India.

District health organization - identifies and provide the needs of expanding rural health and family welfare programme. Within each district

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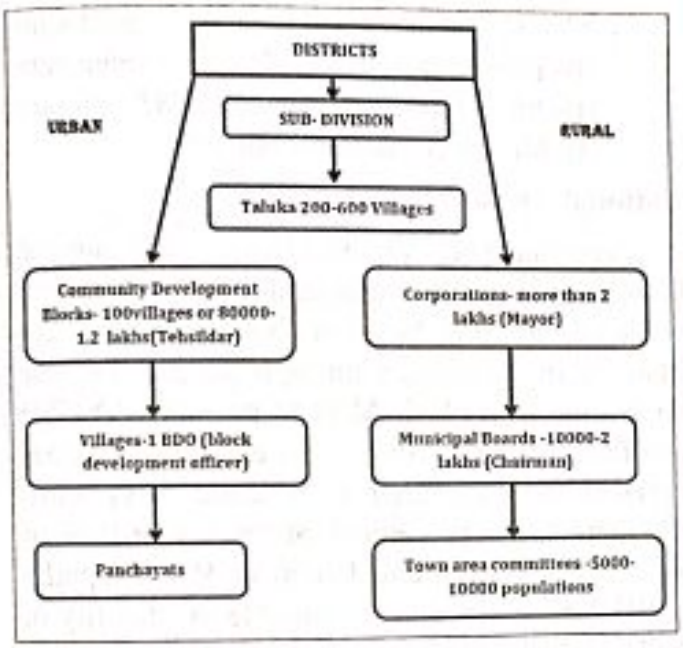
again, there are 6 types of administrative areas. No uniform model of district health organization.

1. Sub- divisions
2. Tehsils
3. Community development blocks
4. Municipalities and corporations
5. Village
6. Panchayats



Panchayati Raj-Three tier structure of rural local self-government in India, linking the village to the district.

1. Panchayat – at the village level
2. Panchayat Samiti- at the block level
3. Zilla Parishad- at the district level

At the village level

1. The Gram Sabha- It is the assembly of all the adults of the village, which meets at least twice a year. The gram sabha considers proposals for taxation, discussion the annual programme and elects members of the gram Panchayat.

2. The Gram Panchayat- It is the executive organ of the Gram Sabha, and an agency for planning and development at the village level. Its strength varies from 15 to 30, and the population covered also varies from 5,000 to 15,000 or more. The member of the Panchayat holds office for a period of 3 to 4 years. Every panchayat has an elected president (Sarpanch or Sabhapati or Mukhiya), a vice president and a panchayat secretary. The powers and functions of the Panchayat secretary are very wide- they cover the entire field of civic administration, including sanitation and public health; and of social and economic development of the village.

3. The Nyaya Panchayat-

At the block level- The block consists of the about 100 villages and a population of about 80,000 to 1,20,000. The Panchayat Raj agency at the block level is the Panchayat Samiti/ Janpada Panchayat. The Panchayat samite consists of all Sarpancha of the village panchayat in the block: MLAs, MPs residing in the block area, representatives of women, scheduled castes, scheduled tribes and cooperative societies. The block development officer (BOD) is the ex-officio secretary of the Panchayat Samiti.

At the district level- The Zilla Parishad is the agency of rural local self-government at the district level. The member of the Zila Parishad include all heads of the Panchayat samitis in the district MPs, MLAs of the district; representatives od scheduled castes, schedule tribes and women; and 2 persons of experience in administration, public life or rural development.

Community health Centre's

Established and maintained by the State Government under programme.

As per minimum norms, a CHC is required to be manned by four Medical Specialists i.e. Surgeon, Physician, Gynecologist and Pediatrician supported by 21 paramedical and other staff.

It has 30 in-door beds with one OT, X-ray, Labour Room and Laboratory facilities.

It serves as a referral centre for 4 PHCs and also provides facilities for obstetric care and specialist consultations. As on March, 2011, there are 4,809 CHCs functioning in the country.

Primary health Centre's

First contact point between village community and the Medical Officer.

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To provide an integrated curative and preventive health care with emphasis on preventive and promotive aspects of health care.

Established and maintained by the State Governments under the Programme.

Manned by a Medical Officer supported by 14 paramedical and other staff.

NRHM - two additional Staff Nurses at PHCs (contractual).

It acts as a referral unit for 6 Sub Centre's and has 4 - 6 beds for patients.

There were 23,887 PHCs functioning in the country as on March 2011.

Sub-Centre

Most peripheral and first contact point between the primary health care system and the community.

Manned by at least one ANM / Female Health Worker and one Male Health Worker.

Under NRHM, one additional second ANM on contract basis.

Provide services in relation to maternal and child health, family welfare, nutrition, immunization and control of communicable diseases.

Provided with basic drugs for minor ailments.

Ministry of Health & Family Welfare are providing 100% Central assistance to all the Sub-Centre's. 148,124 Sub Centre's functioning in the country as on March 2011.

Village

Accredited Social Health Activist (ASHA) for 1000 population

Chosen by and accountable to the panchayat.

Act as the interface between the community and the public health system.

Facilitate preparation and implementation of the Village Health Plan

The other persons are :

- Dais
- Anganwadi workers

AYUSH

- Old acceptance in the communities in India.
- Form the first line of treatment in case of common ailments in most of the places
- Ayurveda is the most ancient medical system with an impressive record of safety and efficacy.
- Mainstreaming AYUSH to strengthen the Public Health System at all levels.
- AYUSH facilities had been co-located with 208 District Hospitals (36%), 910 Community Health Centres (23%) and 3883 Primary Health Centres in the country.

National Ayush Mission (NAM)

Department of AYUSH, Ministry of Health and Family Welfare, Government of India has launched National AYUSH Mission (NAM) during 12th Plan for implementing through States/UTs. The basic objective of NAM is to promote AYUSH medical systems through cost effective AYUSH services, strengthening of educational systems, facilitate the enforcement of quality control of Ayurveda, Siddha and Unani & Homoeopathy (ASU &H) drugs and sustainable availability of ASU & H raw- materials.

Vision

a. To provide cost effective and equitable AYUSH health care throughout the country by improving access to the services.

b. To revitalize and strengthen the AYUSH systems making them as prominent medical streams in addressing the health care of the society.

c. To improve educational institutions capable of imparting quality AYUSH AYUSH education

d. To promote the adoption of Quality standards of AYUSH drugs and making available the sustained supply of AYUSH raw-materials.

Objectives

1. To provide cost effective AYUSH Services, with a universal access through upgrading AYUSH Hospitals and Dispensaries, co-

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location of AYUSH facilities at Primary Health Centres (PHCs), Community Health Centres (CHCs) and District Hospitals (DHs).

2. To strengthen institutional capacity at the state level through upgrading AYUSH educational institutions, State Govt. ASU&H Pharmacies, Drug Testing Laboratories and ASU & H enforcement mechanism.
3. Support cultivation of medicinal plants by adopting Good Agricultural Practices (GAPs) so as to provide sustained supply of quality raw- materials and support certification mechanism for quality standards, Good Agricultural/Collection/Storage Practices.
4. Support setting up of clusters through convergence of cultivation, warehousing, value addition and marketing and development of infrastructure for entrepreneurs.

MCQ on Health Administration

1. Three-Tier system of Health care delivery in rural areas in India is based on the recommendations of:
   a) Bhore Committee
   b) Chadah Committee
   c) Srivastava Committee
   d) Mudalair Committee
2. Panchayati Raj System is a 3-tier system of rural local self-government in India. Match the institutions with levels:
   A – Panchayat, I – Village level
   B – Panchayat Samiti, II – District level
   C – Zila Parishad, III – Block level
   a) A-III, B-II, C-I b) A-II, B-III, C-I
   c) A-I, B-III, C-II d) A-I, B-II, C-III
3. Principal Unit of Administration in India is:
   a) Centre b) State
   c) District d) Village
4. A sub-centre is manned by:
   a) Medical Officer
   b) Multipurpose worker
   c) Health Assistant
   d) Aanganwadi worker
5. ASHA is posted at the:
   a) Village level
   b) Community Health Centre
   c) Primary Health Centre
   d) Sub-centre
6. At the village level, the Panchayati Raj consists of all of the following except?
   a) Zila Parishad b) Nyaya Panchayat
   c) Gram Panchayat d) Gram Sabha
7. Integration of health services was first proposed by:
   a) Bhore committee
   b) Jungallwalla committee
   c) Mudaliar committee
   d) Srivastava committee
8. Rural health scheme introduced by:
   a) Bhore committee
   b) Mukherjee committee
   c) Shrivastava committee
   d) Mudaliar committee
9. Who among the following is Chairman of Central Council for Health?
   a) Prime minister
   b) Secretary of health
   c) Union health minister
   d) Director General of Health Sciences
10. Population of 1000 is covered by:
    a) Anganwadi worker b) Health assistant
    c) Doctor d) Village health guide

Answers on MCQ on Health Administration

1. Ans.(c) Srivastava Committee
2. Ans. (c) District
3. Ans.(c) A-I, B-III, C-II
4. Ans.(d) Aanganwadi worker
5. Ans. (a) Village Level
6. Ans. (a) Zila Parishad
7. Ans. (b) Jungallwalla committee
8. Ans. (c) Srivastava Committee
9. Ans. (c) Union health minister
10. Ans. (d) Village health guide

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Chapter 24 National Health Programmes

Syllabus

National Health Programs: Leprosy (NLEP), AIDS (NACP), Blindness (NPCB), Polio , National TB Elimination program , Vector born disease control program, RCH program, ICDS program, Universal Immunization program, National mental health program, National Program for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases & Stroke (NPCDCS) , Swachha Bharat mission, Ayushman Bharat Yojana, Ayushman, Bharat Digital Mission, National health mission (NRHM&NUHM), National AYUSH Mission (NAM), National nutrition programs: National Iodine Deficiency Disorders Control program, National Iron Plus Initiative for Anemia Control, National Vitamin A prophylaxis program, Mid-Day Meal program & Balwadi nutrition program.

Learning objectives

1. State the vision/objective and outline the goals, strategies and plan of action of National Health Programs - Leprosy(NLEP), AIDS (NACP), Blindness (NPCB), Polio, National TB Elimination Program, Vector born disease control program, RCH program, ICDS program, Universal Immunization Program, National mental health program, National Program for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases & Stroke (NPCDCS), Swachha Bharat mission, Ayushman Bharat Yojana, Ayushman Bharat Digital Mission, National health mission (NRHM&NUHM), National AYUSH Mission (NAM).
2. National nutrition programs- National Iodine Deficiency Disorders Control program, National Iron Plus Initiative for Anemia Control, National Vitamin A prophylaxis program, Mid- Day Meal program & Balwadi nutrition program.

Total – 10 hours (Lecture :7 hours, Non-lecture: 3 hours)
MCQ- Yes- SAQ (5 Marks)- No- LAQ (10 Marks)- Yes

The Indian government has been working hard (since 1947) to improve the health of the populace by enhancing sanitation, living conditions, nutritional status, and controlling or eradicating diseases, both communicable and noncommunicable. It has received support from a number of international organisations, including WHO, UNICEF, the World Bank, as well as foreign agencies like SIDA, DANIDA, NORAD, and USAID in the form of grants. From the beginning of the Five-Year Plans (in 1951), the Government of India developed and implemented particular programmes known as "National Health Programmes" for managing/eradicating health issues in accordance with the recommendations of the Bhore Committee.

The National Health Programs (NHPs) are of three kinds:

1. 100 percent centrally sponsored programs, but implementation is by the State Governments.
2. 50:50 centrally sponsored programs, i.e., the implementation is by the State Government However 50 percent of the expenses are incurred by the Central Government and remaining 50 percent by the State Government.
3. Vertical programs- In this type both the implementation and incurring expenditure is by the Central Government only.

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Related to Communicable Diseases

1. National Anti-malaria Program (NAMP) (1999)
2. National Filaria Control Program (1955)
3. National Kala-azar Control Program (1991)
4. National Japanese Encephalitis Control Program (2003–04)
5. National Dengue Fever/Dengue Haemorrhagic Fever Control Program (2003–04)
6. National Leprosy Eradication Program (1983)
7. National Guinea-worm Eradication Program (1983)
8. National Polio Eradication Program (1995)
9. Universal Immunization Program (1985)
10. Revised National Tuberculosis Control Program (1993)
11. National Acute Respiratory Infections Control Program
12. National Diarrheal Disease Control Program
13. National AIDS Control Program.

Related to Noncommunicable Diseases

1. National Program for the Control of Blindness
2. National Cancer Control Program (1975)
3. National Program for Control of Diabetes,
4. Cardiovascular Diseases and Stroke.
5. National Mental Health Program (1982)
6. National Iodine Deficiency Disorders Control Program (1962).
7. National Program for Control and Treatment of Occupational Diseases.
8. National Program for the prevention and Control of Deafness.

Related to Nutrition

1. National Vitamin A Prophylaxis Program (1970)
2. National Nutritional Anemia Prophylaxis Program (1970)
3. National Special Nutrition Program (1970)
4. National Balwadi Nutrition Program
5. Mid-Day School Meal Program (1962)
6. Integrated Child Development Services Scheme (1975).

Other Health Programs

1. National Tobacco Control Program
2. National Family Welfare Program (1953)
3. Reproductive and Child Health (RCH) Program
4. All India Hospital Postpartum Program
5. National Water supply and Sanitation Program (1954)
6. Minimum Needs Program (1974)
7. 20-Point Program (1975).

National Leprosy "Eradication" Programme

The National Leprosy Control Program (NLCP) has been in operation since 1955, as a centrally aided programme to achieve control of leprosy through early detection of cases and DDS (dapsone) mono-therapy on an ambulatory basis.

In 1983 the control programme was re-designated national leprosy "eradication" programme with the goal of eradicating the disease by the turn of the century. The aim was to reduce case load to 1 or less than 1 per 10,000 populations.

To strengthen the process of elimination of leprosy in the country, the first World Bank supported project was introduced in 1983. On completion of this project, the 2nd phase of project with World Bank supports was started in 2001-02 which ended in December 2004.

Components of the programme are as follows-

1. Decentralized integrated leprosy services through general health care system;
2. Capacity building of all general health services functionaries;
3. Intensified information, education and communication;
4. Prevention of disability and medical rehabilitation and
5. Intensified monitoring and supervision.

After introduction of MDT, the recorded case load of leprosy came down from 57.6 cases per 10,000 populations in 1981 to less than one at the

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national level in December 2005, and the country could achieve the goal of the leprosy elimination at national level as set by the national health policy (2002). 32 states/ UTs achieved the status of leprosy elimination. Only 3 states/UTs viz. Bihar, Chhattisgarh and Dadra and Nagar Haveli are yet to achieve elimination.

Major initiatives

1. More focus has now been given to new case detection than prevalence which only gives the number of cases on record at a point in time. The new case detection rate is the main indicator for programme monitoring.
2. Treatment completion rate been taken as an important indicator, to be calculated by states at yearly basis.
3. More emphasis is being given on providing disability prevention and medical rehabilitation services to leprosy affected persons.

a. Dressing materials, supportive medicines and ulcer kits are provided to leprosy affected persons with ulcers and wounds. These services are also provided to leprosy affected persons residing in self-settled colonies.

b. Micro-cellular rubber footwear is provided for protection of insensitive feet. 36 NGOs in the country and 33 Govt. medical college have been strengthened for providing reconstructive surgery services to leprosy affected persons for correction of their disability, thus totalling to 69 centers for conducting reconstructive surgeries in the country.

c. Am amount of Rs.5000 /- is provided as incentive to each leprosy affected person from BPL family undergoing reconstructive surgery in these identified institution to compensate for loss of wages.

d. Support is also provided to government institutions/ PMR centers in the form of Rs. 5000/- per reconstructive surgery conducted.

4. ASHAs have been involved in bring out suspected leprosy cases from their villages for diagnosis and treatment at PHC and follow up of confirmed cases for their treatment completion. To facilitate the involvement of ASHA in the programme, they are being paid incentive money as below:

a. On confirmed diagnosis of case brought by them Rs. 100/-

b. On completion of full course of treatment of the case with on specified time- PB leprosy case- Rs-200/- and MB leprosy case-Rs- 400/-.

5. There are 612 self-settled colonies in the country where more than 50,000 leprosy affected persons reside. Free medical facilities like care of ulcers, self-care training, and counselling and MCR footwear are provided to leprosy affected persons residing in these colonies through paramedical workers/NGOs on weekly/ fortnightly basis.
6. Intensive IEC campaign with a theme "towards leprosy free India" has been carried out toward further reduction of leprosy burden in the community, early reporting of cases and their treatment completion, provision of quality leprosy services and reduction of stigma and discrimination against leprosy affected persons. Awareness generation activities are carried out through mass media and local media.

Multidrug Treatment

Multidrug chemotherapy used to be initiated only after confirmation of the disease and classified as multibacillary (infectious) and paucibacillary (non-infectious) categories. The treatment used to be given in a phased manner (2 phases) as follows:

Multibacillary Leprosy

- Intensive phase (lasting for 14 days)

1. Rifampicin 600 mg daily (supervised)
2. Clofazimine 300 mg daily (supervised)
3. Dapsone 100 mg daily (supervised)

- Continuation phase (lasting for 2 or more years).

1. Rifampicin 600 mg once a month (supervised) (pulse dose)
2. Clofazimine 50 mg daily and 300 mg (supervised) once a month.
3. Dapsone 100 mg daily (unsupervised).

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Duration of treatment used to be for a minimum of 2 years or until 2 consecutive skin smears taken at monthly interval become negative, whichever is later. The follow-up was done once in 6 months for 5 years.

Paucibacillary Leprosy

1. Rifampicin 600 mg once a month (supervised)
2. Dapsone 100 mg daily (unsupervised)

MDT is very effective with high cure rate and zero relapses. It prevents deformities and lepra reactions. Duration of treatment was for one year and follow up was once in 6 months for 2 years.

Infrastructure

National Leprosy Eradication Program was implemented through the establishment of following infra-structures:

1. Leprosy control units
2. Survey education treatment centers
3. Urban leprosy centers
4. Mobile leprosy treatment units.

Regimen for Paucibacillary Cases

1. Single skin lesion—single dose

Adults: Rifampicin—600 mg

Ofloxacin—400 mg

Minocycline—100 mg

Children: Half the adult dose

Follow-up: Once in a year for 2 years.

2. Single nerve lesion with 2–5 skin lesions.

Adults: Dapsone—100 mg daily self-administered

Rifampicin—600 mg, once a month, supervised.

Children: Proportionately less

Duration of treatment: 6 months

Follow up: Once a year for 2 years.

Regimen for Multibacillary Cases

Adults: Dapsone – 100 mg daily. Self-administered.

Clofazimine – 50 mg daily or 100 mg on alternate days. Self-administered.

Clofazimine – 300 mg monthly (Pulse) dose

Rifampicin – 600 mg (Supervised)

Children: Proportionately less

Duration of treatment: 12 months

Follow up: Once a year for 5 years.

National AIDS Control Programme (NACP)

National AIDS control programme was launched in India in the year 1987. The ministry of Health and Family Welfare has set up National AIDS Control Organization (NACO) as a separate wing to implement and closely monitor the various components of the programme.

The aim of the programme is to prevent further transmission of HIV, to decrease morbidity and mortality associated with HIV infection and to minimize the social-economic impact resulting from HIV infection.

In India, after the first case of HIV was detected in Chennai in 1986, the virus spread rapidly across the nation in both urban and rural areas. Since then, the HIV epidemic has travelled a long way, establishing itself with the greatest speed in the six high prevalence states of Andhra Pradesh, Maharashtra, Manipur, Nagaland, Karnataka and Tamil Nadu

The natural history of the HIV epidemic has played out in various forms - from the injecting drug use-driven epidemic of the North East seen in Manipur and Nagaland, to the sex work-driven epidemic of the south of India. Since, every country and every government needs to have a solution to deal with such an issue; the government formulated the National AIDS Control Program.

Phase-I (1992 - 1999) was implemented across the country with objective to slow the spread of HIV to reduce future morbidity, mortality, and the impact of AIDS by initiating a major effort in the prevention of HIV transmission.

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Phase-II (1999 - 2006) was aimed at reducing spread of HIV infection in India and strengthens India's capacity to respond to HIV epidemic on long term basis

Phase-III (2007-2012) was based on the experiences and lessons drawn from NACP-I and II, and is built upon their strengths. Its priorities and thrust areas are drawn up accordingly and include the following:

1. Considering that more than 99 percent of the population in the country is free from infection, NACP-III places the highest priority on preventive efforts while, at the same time, seeks to integrate prevention with care, support and treatment.
2. Sub-populations that have the highest risk of exposure to HIV receive the highest priority in the intervention programs. These would include sex workers, men-who-have-sex-with-men and injecting drug users. Second high priority in the intervention programs is accorded to long-distance truckers, prisoners, migrants (including refugees) and street children.
3. In the general population those who have the greater need for accessing prevention services, such as treatment of STIs, voluntary counseling and testing and condoms, will be next in the line of priority.
4. NACP-III ensures that all persons who need treatment would have access to prophylaxis and management of opportunistic infections. People who need access to ART will also be assured first line ARV drugs.
5. Prevention needs of children are addressed through universal provision of PPTCT services. Children who are infected are assured access to pediatric ART.
6. NACP-III is committed to address the needs of persons infected and affected by HIV, especially children.
7. NACP-III also plans to invest in community care centers to provide psycho-social support, outreach services, referrals and palliative care.
8. Socio-economic determinants that make a person vulnerable also increase the risk of exposure to HIV. NACP-III will work with other agencies involved in vulnerability reduction such as women's groups, youth groups, trade unions etc. to integrate HIV prevention into their activities

National AIDS prevention and control policy

In April 2002, the Government of India approved the National AIDS Prevention and control Policy. The objectives included reduction of the impact of epidemic and to bring about a zero-transmission rate of AIDs by year 2007.

1. Blood safety programme- NACO is committed to bridge the gap in the availability and improve quality of blood under NACP-III. To achieve these objectives NACO plans to:

- Raise voluntary blood donation to 90 percent
- Establish blood storage centers in Community Health Centers
- Expand external quality assessment services for blood screening
- Quality management in blood transfusion services

2. Counselling and HIV testing- HIV testing is carried out on a voluntary basis with appropriate pre-test and post- test counselling. The basis and objective of testing are to monitor the trend of HIV infection in a population or sub-group; to test blood, organ or tissue for ensuring safety of the recipients and to identify an individual with HIV infection on voluntary testing basis.

3. STD control programme- STD control is linked to HIV/AIDS control as behaviour resulting in the transmission of STD and HIV are same. HIV is transmitted more easily in the presence of another STD, hence; early diagnosis and treatment of STD is now recognized as one of the major strategies to control spread of HIV infection.

4. Condom promotion- among the probable source of HIV infection in India. Heterosexual promiscuity constitutes the major route, as almost 87 per cent HIV infections occur due to unprotected and multi-partner sexual contacts. This

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type of transmission can be prevented by consistent use of good quality condoms.

5. Behaviour surveillance – to assess the changing pattern of behaviour in different risk groups of population, behavioural sentinel surveillances will be instituted initially on pilot basis, which will be expended as per the needs of the programme from time to time.

6. Targeted interventions- the basic purpose of the targeted intervention programme is to reduce the transmission of HIV amongst the most vulnerable population.

7. School AIDS education programme- The school AIDs education is one of the important activities of NACP that focuses towards student youth to raise awareness level and develop a safe and responsible life-style.

National Programme for Control of Blindness (NPCB)

It was launched in year 1976 as a fully centrally sponsored programme and incorporates the earlier trachoma control programme started in year 1968.

Strategy-

1. Strengthening service delivery.
2. Developing human resource for eye care.
3. Promoting outreach activities and public awareness.
4. Developing institutional capacity to establish eye care facilities for every 5 lakhs persons.

In 1998-99 and 1999-2000 surveys were conducted and following measure were included on the basis of their finding.

1. To make the programme more successful by strengthening service for other causes of blindness, refractive errors in school children, glaucoma, improving follow-up services of Cataract operated persons and treating causes of blindness.
2. To shift from the eye camp approach to a fixed facility surgical approach and from conventional surgery to IOL (Intraocular lenses) implantation for better quality of post-operative vision in operated patients.
3. To expand the World Bank project activities like construction of dedicated eye operation theatres, eye wards at district level, training of eye surgeons in modern surgery and supply of ophthalmic equipment to the whole country.
4. To strengthen Participation of NGOs and to mark geographic area to avoid duplication of efforts of government units like medical colleges, districts hospitals CHC, PHC etc.
5. To enhance the coverage of eye care services in tribal and other underserved area.

Objective of the programme

1. To reduce the backlog of blindness through identification and treatment of blind;
2. To develop eye care facilities in every district of the country
3. To develop human resources for providing eye care services;
4. To improve quality of service delivery;
5. To secure participation of voluntary organization in eye care and
6. To enhance community awareness on eye care services.

Operational Strategies

1. Undertaking blindness surveys
2. Performance of cataract operations
3. Provision of postoperative care
4. Establishment of eye-banks
5. Establishment of training and IEC facilities
6. Provision of supportive facilities.

NPCB Achievement

1. Rate of cataract surgery is increasing steadily
2. IOL implantation has raised from 20 percent during 1997- 98 to 83 percent during 2004-05
3. Rate of detection of refractive errors among school children is increased
4. Involvement of medical officers of PHC is increased
5. 84 percent of cataract operated cases receive free spectacles.

Targets for Tenth Five Year Plan

1. To increase the rate of cataract surgery to 450 per lakh population

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2. To increase the rate of IOL implantation to more than 80 percent among the cataract surgery cases by the year 2007
3. To develop 50 paediatric ophthalmology units
4. To improve the facilities for early diagnosis and treatment of glaucoma and diabetic retinopathy
5. To develop 25 fully operational eye bank network
6. To develop human resources by providing training to personnel at various levels
7. To supply ophthalmic equipment and grants to NGOs.

'Right to Sight' Initiative (Vision 2020)- To minimise avoidable (preventable and curable) blindness by the year 2020, a global initiative has been initiated. By 2012, the prevalence of blindness in India aims to be reduced to 0.5%, and no child would be born in India blind unnecessarily after that year. By 2020, there must be a vision guardian for every 5000 people. The Indian government has also endorsed this project.

Pulse Polio Programme (PPI)

With the global initiative of eradication of polio in 1988 following World Health Assembly resolution in 1988, Pulse Polio Immunization programme was launched in India in 1995.

The term 'Pulse' has been used to describe the sudden, simultaneous, mass administration of OPV, to all the under-five children of the entire country with a cent-percent coverage, with 2 doses, on the indicated dates, with 6 weeks interval, during the lowest transmission season, October to February, irrespective of their previous immunization status. About 172 million children are immunized during each National Immunization Day (NID).

The last polio case in the country was reported from Howrah district of West Bengal with date of onset 13th January 2011. Thereafter no polio case has been reported in the country (25th May 2012). WHO on 24th February 2012 removed India from the list of countries with active endemic wild polio virus transmission.

Objective

1. The Pulse Polio Initiative was started with an objective of achieving hundred per cent coverage under Oral Polio Vaccine. It aimed to immunize children through improved social mobilization, plan mop-up operations in areas where poliovirus has almost disappeared and maintain high level of morale among the public. Since then there is a significant decline in the incidence of poliomyelitis.
2. Following the success of the polio eradication programme, the next likely diseases for eradication are measles and neonatal tetanus.

Strategies-

1. Sustain and maintain high level of routine immunization coverage of infants.
2. Pulse polio immunization –
3. Acute flaccid paralysis (AFP) surveillance- for detect final reservoirs of wild polio virus infection
4. Mop-Up immunization

a. On **first day** after giving OPV to children in booth of immunization. Gentian Violet mark is made on the finger.

b. On **second day** House to House visit is made and mark "X" for those houses who are not cooperative or which are locked or target child is not immunized by looking at violet mark and mark "P" for those houses where target children are immunized or target children are not available.

c. On the **third day** visit is made only for "X" marked houses and target children are immunized and the mark "X" is wiped of and converted into "p".

National TB Elimination Program

Tuberculosis (TB) control activities are implemented in the country for more than 50 years. The National TB Programme (NTP) was launched by the Government of India in 1962 in the form of District TB Centre model involved with BCG vaccination and TB treatment. In 1978, BCG

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vaccination was shifted under the Expanded Programme on Immunization. Around the same time in1993, the WHO declared TB as a global emergency, devised the directly observed treatment – short course (DOTS), and recommended to follow it by all countries.

The Government of India revitalized NTP as Revised National TB Control Programme (RNTCP) in the same year. DOTS was officially launched as the RNTCP strategy in 1997 and by the end of 2005 the entire country was covered under the programme and then into the National Tuberculosis Elimination program in 2020. This decision was declared by Special Secretary, Sanjeeva Kumar, Ministry of Health and Family Welfare, in a letter to all the State Chief Secretaries.

Tuberculosis (TB) is an infectious disease caused by the bacterium Mycobacterium tuberculosis (MTB) which generally affects the lungs, but can also affect other parts of the body.

Risk factors

Malnutrition	Diabetes
HIV infection	Poor immunity
Overcrowding	Inadequate ventilation
Occupational risks	Severe kidney disease

Enclosed living/ working conditions

Other lung diseases e.g. silicosis

Substance abuse etc.

One patient with infectious pulmonary TB if untreated can infect 10-15 persons in a year.

Vision: A world free of TB (Zero TB deaths, Zero TB disease, and Zero TB suffering)

Goal: End the Global TB Epidemic (<10 cases per 100,000 population)

National Strategic Plan for Tuberculosis Elimination 2017-2025

RNTCP has released a 'National strategic plan for tuberculosis 2017-2025' (NSP) for the control and elimination of TB in India by 2025. According to the NSP TB elimination have been integrated into the four strategic pillars of "Detect – Treat – Prevent – Build" (DTPB).

Detect: The first objective of NSP is to find all drug sensitive TB cases (DS-TB) and drug resistant TB cases (DRTB) with an emphasis on reaching TB patients seeking care from private providers and undiagnosed TB cases in high-risk populations (such as prisoners, migrant workers, people living with HIV/AIDS, contacts etc.).

Early diagnosis and treatment of TB cases in the community is an important step in TB elimination, which will help in decreasing the risk of transmission of disease to others, poor health outcomes, and social and economic hardships of the patient and their family.

Since 2012, the Ministry of Health and Family Welfare in India mandates monthly notification of TB cases from healthcare providers, including government, private, and NGO sectors. This includes all laboratories and local health authorities.

Nikshay : To facilitate TB notification, RNTCP has developed a case-based web-based TB surveillance system called "NIKSHAY" (https://nikshay.gov.in) for both government and private health care facilities. Future enhancements under NIKSHAY are for patients support, logistics management, direct data transfers, adherence support and to support interface agencies which are supporting programme to expand the reach.

Direct Benefit Transfer (DBT) schemes

1. Honorarium to Treatment Supporters – For provision of treatment support to TB patients (Adherence, ADR monitoring, counselling Rs.1000/- to Rs.5000/-)
2. Patient Support to Tribal TB Patients (Financial Patient Support Rs750/-)
3. Nutritional Support to All TB patients (Financial Support to Patients Rs.500/-month)
4. Incentives to Private Providers (Rs.500/- for Notification & Rs.500/- for reporting of Treatment Outcome
5. Incentives to Informant (Rs. 500/- is given on diagnosis of TB among referrals from community to public sector health facility)

Treat : The program aims to initiation and sustain anti-TB treatment for TB patients.

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providing patient-friendly care and social support. Free TB drugs are provided in daily fixed dose combinations (FDCs) with direct observed treatment (DOT) to improve adherence. This strategy, supported by friends, relatives, or laypeople, ensures a successful treatment and prevents drug resistance development.

TB patients screen for rifampicin resistance and additional drugs; daily fixed dose combinations are administered for drug-sensitive TB. First line treatment of drug-sensitive TB consists of a two-months (8weeks) intensive phase with four drug FDCs followed by a continuation phase of four months (16 Weeks) with three drug FDCs.

For new TB cases, the treatment in intensive phase (IP) consists of eight weeks of Isoniazid (INH), Rifampicin, Pyrazinamide and Ethambutol (HRZE) in daily doses as per four weight band categories and in continuation phase three drug FDCs- Rifampicin, Isoniazid, and Ethambutol (HRE) are continued for 16 weeks.

For previously treated cases of TB, the Intensive Phase is of 12 weeks, where injection streptomycin is given for 8 weeks along with four drugs (INH, Rifampicin, Pyrazinamide and

Ethambutol) and after 8 weeks the four drugs (INH, Rifampicin, Pyrazinamide and Ethambutol) in daily doses as per weight bands are continued for another four weeks. In continuation phase Rifampicin, INH, and Ethambutol are continued for another 20 weeks as daily doses.

Nikshya Poshak Yozana: It is centrally sponsored scheme under National Health Mission (NHM), financial incentive of Rs.500/- per month is provided for nutritional support to each notified TB patient for duration for which the patient is on anti-TB treatment. Incentives are delivered through Direct benefit transfer (DBT) scheme to bank accounts of beneficiary.

Prevent: With the objective to prevent emergence of TB in susceptible population various measures are indicated as:

- Scale up air-borne infection control measures at health care facilities
- Treatment for latent TB infection in contacts of bacteriologically-confirmed cases
- Address social determinants of TB through intersectoral approach.

1. Air borne infection control measures-

- Early diagnosis, and proper management of TB patients.
- Health education about cough etiquettes and proper disposal of sputum by patient.
- Houses should be adequately ventilated.
- Proper use of air borne infection control measures in health care facilities and other settings

2. Contact tracing-

- All close contacts, especially household contacts
- In case of paediatric TB patients, reverse contact tracing for search of any active TB case in the household of the child must be undertaken.
- Particular attention will be paid to contacts with the highest susceptibility to TB infection.

3. Isoniazid Preventive Therapy (IPT)- Preventive therapy is recommended to Children < 6 years of age, who are close contacts of a TB patient.

- For all HIV infected children who either had a known exposure to an infectious TB case or are Tuberculin skin test (TST) positive (>=5mm induration) but have no active TB disease.
- All TST positive children who are receiving immunosuppressive therapy (e.g. Children with nephrotic syndrome, acute leukemia, etc.).
- A child born to mother who was diagnosed to have TB in pregnancy will receive prophylaxis for 6 months, provided congenital TB has been ruled out. BCG vaccination can be given at birth even if INH preventive therapy is planned.

4. BCG vaccination- It is provided at birth or as early as possible till one year of age. BCG vaccine has a protective effect against meningitis and disseminated TB in children.

5. Addressing social determinants of TB - like

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poverty, malnutrition, urbanization, indoor air pollution, etc. require inter departmental/ ministerial coordinated activities and the programme is proactively facilitating this coordination.

BUILD: Health system strengthening for TB control under the National Strategic Plan 2017-2025 is recommended in the form of building and strengthening enabling policies, empowering institutions and human resources with enhanced capacities.

Revised National Tuberculosis Control Program (RNTCP)

National tuberculosis programme (NTP) has been in operation since 1962.

Its two objectives

1. Long term objectives.
2. Short term objectives.

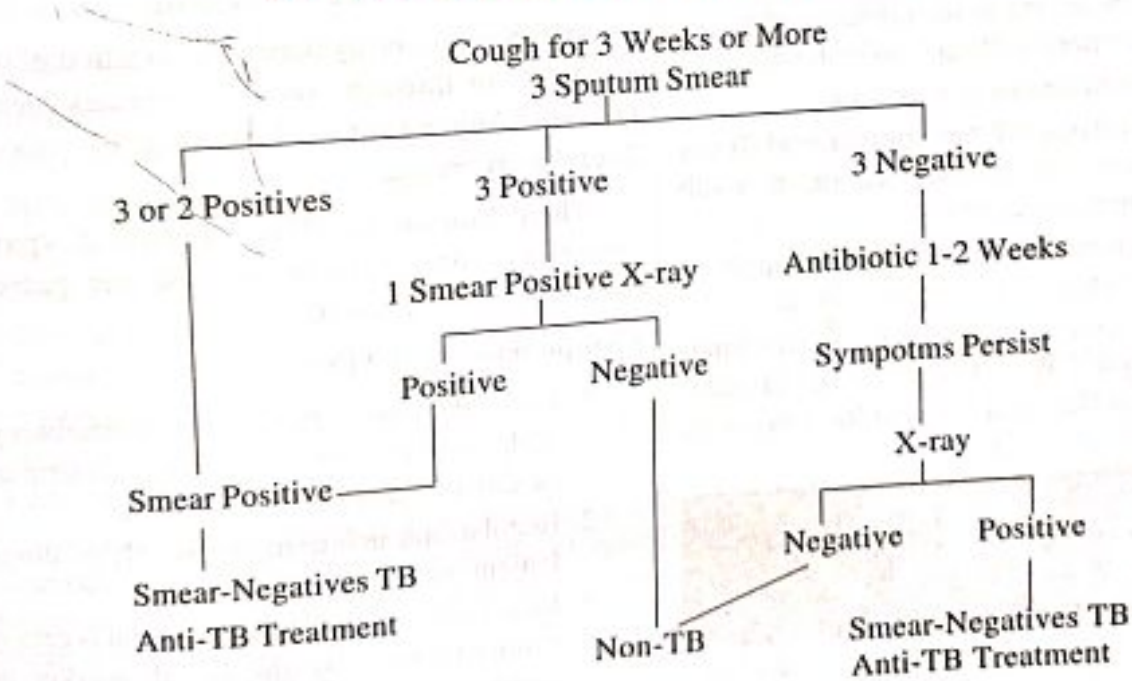
1. Long term objectives-

- one case infects less than one new person annually
- The prevalence of infection in the age group below 14 years is brought down to less than 1 percent.

2. Short term objectives-

- To detect maximum number of T.B. cases among the out patients attending any health institution with symptoms suggestive of tuberculosis & treat them effectively
- To vaccinate new born & infant with BCG.
- To undertake the above objectives in an integrated manner through all the exiting health institutions in the country.

Diagnosis of TB in RNTCP - Smear Examination



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The government of India WHO &World Bank together reviewed the NTP in the year 1992. Based on the findings a revised strategy for NTP was evolved.

The salient features of this strategy are :

1. Achievement of at least 85 percent cure rate of infectious cases through supervised short course chemotherapy involving peripheral health functionaries.
2. Augmentation of case finding activities through quality sputum microscopy to detect at least 70% estimated cases.
3. Involvement of NGO's information, education & communication & improved operational research.

Revised Strategy

1. Augmentation of organizational support at Central and State levels for meaningful coordination
2. Increased budgetary outlay
3. Use sputum testing as the primary method of diagnosis among self-reported patients
4. Standardized treatment regimens
5. Augmentation of the peripheral level supervision through the creation of a sub district supervisory unit
6. Ensuring a regular, uninterrupted supply of drugs up to the most peripheral level
7. Emphasis on training, IEC, Operational research and NGO involvement in the program

Difference in National Tuberculosis Program (NTP) and Revised NTCP

	National Tuberculosis Program (NTP)	Revised NTCP
Objective	Early diagnosis & Treatment	Breaking the chain of transmission
Operational Targets	1. Not defined	1. Cure rate 85% 2. Case finding 70% of estimated cases
Strategy	1. Short Course Chemotherapy (SCC) unsupervised 2.Conventional	1.DOTS (Directly Observed Treatment Short Course Chemotherapy 2.Uninterrupted drug supply
Diagnosis	1.More emphasis on X-rays 2.Two sputum smears 3.One sputum positive is considered a case	1.Mainly sputum microscopy 2.Three sputum smears 3.One positive is not a case

Direct Observed Therapy Short-term (DOTS)

DOTS is a community based TB treatment and care strategy which combines the benefits of supervised treatment, and the benefits of community based care and support.

DOTS are given by peripheral health staff such as MPWs or through voluntary workers such as teachers, Anganwadi workers, Dais, Ex-patients, Social workers etc.

They known as DOT 'agent' & 'paid' incentive/ honorarium of 150 per patient completing the treatment

Components of DOTS

1. Case detection with the help of microscopy with a system of multi-tier cross-checking and quality assurance of sputum smear
2. Regular and uninterrupted supply of drugs: Patient wise box.
3. Direct observation while the patient is getting Chemotherapy by the health worker or community volunteers
4. Systemic evaluation and monitoring to ensure cure
5. Political and administrative commitment to ensure financial support and sustainability

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Diagnosis-Overnight/Early morning

Second day	Sputum examination-Spot-first day	Spot–second day

3 samples of sputum stained with Zeihl Neelsen technique under microscope collected on two days Culture, BACTEC, ELISA Test, PCR Test, Restriction Fragment Length Polymorpism (RFPL), FTB (Fast Plaque TB), QTB-G (Quantiferon TB Gold), Tuberculin Test can be used for diagnosis

Drugs and regimen used in RNTCP- All the drugs are administered thrice weekly

The number before the letters refers to the number of months of treatment

R = Rifampicin
H = INH
Z = Pyrazinamide
O = Ofloxacin
C = Cycloserine
E = Ethambutol
S = Streptomycin
K = Kanamycin
Et = Ethionamide

Treatment under RNTCP-

Category I (Red Box-high priority)-

Type of patients:
New cases sputum smear +ve
Seriously ill sputum –ve
Seriously ill extra-pulmonary
Regimen: 6 months
Intensive phase: 2(HRZE)3
Continuation phase: 4(HR)3
H = INH R = Rifampicin Z = Pyrazinamide E = Ethambutol

Sputum testing done on 2, 4 and 6 months of treatment. If sputum +ve at 4 months then another sputum smear test is done on 5 months. If +ve the patient is declared failure. Registered as a fresh case on the category II regimen.

Category II (Blue Box-High priority)

Type of patients:
Sputum +ve relapse
Sputum +ve failure
Sputum +ve treatment after default
Regimen: 8 months
Intensive phase : 2 (HRZES) 3 + 1(HRZE)3
Continuation phase : 5 (HRE) 3

If sputum smear is +ve even after 3 months of the start of treatment in category II patients

Then four drugs (HRZE)3 excluding streptomycin is extended for one more month.

Category III (Green Box-Low priority)

Type of patients:
Sputum -ve
Extra-pulmonary not seriously ill
Regimen: 6 months
Intensive phase: 2 (HRZ)3
Continuation phase: 4 (HR)3

- Two smears are examined for follow up at the end of two months of treatment
- Also at the end of treatment (6months)
- If patients become sputum +ve during the treatment he is started on a treatment regimen afresh
- Registered as "others" in category II

Category IV: Multi-Drug Resistant TB

Type of patients:
Multidrug resistant TB cases
Regimen: 24 months
Intensive phase: 6 (KOCZEEt)
Continuation phase: 18 (OCEEt)

All drugs are to be administered daily under direct observation by a trained DOT provider accompanied by regular follow up taking smear and culture examination as per the protocol based on international guidelines.

Multi-Drug Resistant TB-WHO defines a multi-drug resistant (MDR) strain as one that is at least resistant to Isoniazid and Rifampicin, with or without resistance to other anti-TB drugs

Extensively Drug Resistant TB-Cases of TB that are resistant to almost all second line drugs are termed extensively drug resistant tuberculosis (XDR-TB)

Defined as occurring when M. tuberculosis is resistant to

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1. At least Rifampicin and Isoniazid (i.e. MDR-TB)
2. Resistant to a Fluoroquinolone
3. Resistant to one or more of the following 2nd line injectable drugs: Amikacin, Capreomycin, Kanamycin.

DOTS-Plus-DOTS-Plus for MDR-TB is a comprehensive management initiative build upon 5 elements of DOTS strategy.

Takes into account specific issues, such as use of second-line anti-TB drugs.

Goal : prevent further development and spread of MDR-TB.

Aim of implementation of DOTS-Plus in selected areas with significant level of MDR-TB is to combat an emerging epidemic.

National Vector Born Disease Control Program

The national vector borne disease control programme (NVBDCP) is implemented in the state for the prevention & control of vector borne diseases namely Malaria, Filariasis, Kala-Azar, Japanese Encephalitis (JE), Dengue & Chikungunya.

Out of six vector borne diseases Malaria, Filariasis, Japanese Encephalitis (JE), Dengue and Chikungunya are transmitted by different kind of vector mosquitoes, while Kala–azar is transmitted by sand files.

National Malaria Eradication Program

It is caused by infection with parasites of the genus Plasmodium. Transmitted by certain species of infected female Anopheline mosquito

- Malaria is one of the vector-borne diseases.
- Causes highest morbidity and mortality over world.
- Claims around eight lakh deaths
- More than 7 crore cases / year
- In India one of the important cause of Mosquito & Men.

Problem

- 100 countries in world are Malarious
- Half in sub-Saharan Africa
- More than 2.4 billion are still at risk

Malaria is a communicable disease caused by the parasite plasmodium. Four species of the plasmodium parasite cause malaria. They are Plasmodium viva, Plasmodium malariae, Plasmodium ovale and Plasmodium falciparum.

It is spread to humans by the bite of an infected female anopheles mosquito. Traveling to mosquito-prone areas increases the risk of contracting the disease. Female mosquitoes are concerned with the transmission of plasmodium whereas male mosquitoes feed only on fruit juice.

Symptoms of Malaria appear after 7 to 40 days following a Mosquito bite.

9 to 14 days for Plasmodium (P.) falciparum.

12 to 18 days for P. vivax and P. ovale.

18 to 40 days for P. malariae.

Diagnosis : The simple diagnostic method for detection of malarial parasites used is a Microscopic examination of blood smears under the microscope. This method of diagnosis is mostly used in endemic countries.

Collected blood specimen is: Smeared on a glass slide, Stained with special staining Giemsa or Romano sky stain,

Examined under a microscope: On microscopic examination, detection and identification of different species of malarial parasite is done.

Thick blood smear examination is done first, as the concentration of parasite is more and on detection of the parasite, a thin film is made and examined under a microscope.

NMCP launched in April 1953- Good results & Substantial reduction of case. NMEP by govt. of India in 1958.

Drug distribution center & fever treatment depots- Drug distribution centers are only to dispense the anti-malaria tablets as per NMEP schedules. Fever treatment depots collect the blood slides in addition to the distribution of anti- malaria tablets. About 4.49 lakh such center are functioning all over the country in rural area till 2006.

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Classification of endemic areas-

Reclassification of endemic areas :

- High endemic areas(API more than 2)
- Low endemic areas (API less than 2)

Area with API more than 2 –

a. spraying(mass)-DDT 2 rounds, 1 g/sq 6 weeks interval

If resistant to DDT, Malathion, 2 rounds, 2 g/ sq meter surface at 6 wks intervals

If resistant to both, Synthetic pyrethroid 2 rounds, o.25 g/sq surface at 6 wks intervals

b. Entomological assessment: going on 72 zonal teams some strains of anopheles double resistance to DDT & BHC some strains of triple resists to DDT, BHC& Malathion.

c. Surveillance: collection & exam of blood smears every 15 days active & passive surveillance activities are carried out.

d. Treatment: treatment to suspects & radical treatment to all confirmed cases.

BHC is discontinued since 1/04/1997 in view of its adverse environment affects

API less than 2 (Low endemic areas)

a. Spraying-Focal insecticide spray around 50 houses or sometimes entire village need spray (in +ve cases)

b. Entomological: same as API

c. Surveillance: Need active & passive servile operation will carried out vigorously every fortnight.

d. Treatment : Detected cases need radical treatment.

e. Follow up – blood smear are to be collected from all positive cases on completion of radical treatment.

Urban Malarial Scheme

Introduced in 1971. Reduce malaria transmission in towns. About 7.4 % of total cases malaria & 10.9 % of deaths due to malaria are reported from Chennai, Vadodara, Vishakha Patanam, Ahmedabad, Kolkata, New Mumbai, Vijayawada etc.

Urban Intensive anti-malarial measures.

- Anti-malarial Month was started in June month to create awareness in community (malaria & prevention)
- Help by World Bank, Malaria Control Project Launched
- By this 100 high endemic dist. selected
- In 1999, Govt. India drop term "National Malaria Eradication Programme" renamed "National Anti-Malaria Programme"
- Activities started in 100 dist. and 19 cities/ towns in states of Karnataka, Tamil Nadu, & West Bengal.

Progress

- Reduction in morbidity & mortality due to malaria:
- In 2004, app 650,000 malaria cases were reported in EMCP Districts, which represent a 45 % decline since 1997.

Goal for the strategic plan 2007-2012-

- At least 50 % reduction in mortality due to malaria by year 2010 as per national health policy documents 2002
- At least 80% of those suffering from malaria get correct, affordable & appropriate treatment within 24 hours of reporting.
- At least 80 % of those at high risk of malaria get protected by effective preventive measures.

National Filaria Control Program

National Filaria Control Program (NFCP) was launched during 1955 to control lymphatic filariasis in the endemic states of the country. It is endemic in 20 states and union territories. Non-endemic states are Jammu and Kashmir, Himachal Pradesh, Delhi, Sikkim and all North-Eastern states except Assam. The Regional Filaria Training and Research Centers situated at Kozhikode (Kerala), Rajahmundry (AP) and Varanasi (UP), are under the control of Director, National Institute of Communicable Diseases, Delhi. At present, there is no viable program for the control of filariasis.

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Objectives

1. To reduce eliminate transmission of lymphatic filariasis by mass drug administration of diethyl carbamazine citrate (DEC).
2. To reduce and prevent morbidity in affected persons and
3. To strengthen the existing health care services by involving NGOs, private and public sectors.

Salient Features of ELF Strategy

- Single day mass therapy with DEC at a dose of 6 mg/kg body weight annually.
- Management of acute and chronic filariasis and self care methods at door step.
- Information Education and Communication (IEC) activities are strengthened for inculcating individual/ community based protective and preventive measures for filarial control.
- Anti-vector measures to be continued as complimentary to anti-parasite measures and microfilaria carriers are detected and treated with DEC for 12 days at 6 mg/kg body wt/ day.

Mass Drug Administration

The International Task Force (WHO) has recommended that in mass treatment, DEC single dose, is given to almost everyone in the community irrespective of whether they

have microfilaraemia or not, in the area of high endemicity, except children under 2 years, pregnant women and very sick patients.

Advantages of single dose mass therapy:

1. It avoids the cost of a mass blood examinations program before treatment.
2. It enhances the compliance as all the members of the community receive treatment.
3. It is as effective as 12-day therapy.
4. It involves decreased delivery cost.
5. It does not require complex management infrastructure.
6. It can be integrated into existing primary health care system.
7. Single dose mass treatment has eliminated filariasis in some countries like Japan, Taiwan, South Korea and Solomon Islands.

National Japanese Encephalitis Control Program (NJECP)

Japanese encephalitis is endemic in states of Andhra Pradesh, West Bengal, Assam, Tamil Nadu, Karnataka, Bihar, Haryana, Kerala and Uttar Pradesh. In 1995, there were 2974 cases and 622 deaths due to JE.

The operational strategy for the control JE comprises:

1. Early case detection and prompt management
2. Control of vectors (Culex vishnui mosquitoes)
3. Sentinel surveillance including clinical surveillance of suspected cases
4. Identification of high-risk groups
5. Development of a safe and standard indigenous vaccine
6. IEC campaign for community participation.

The Directorate of National Anti-malaria Program monitors the control activities.

National Dengue Fever/Dengue Hemorrhagic Fever Control Program

During 1996, an outbreak of dengue was reported in Delhi. Since then dengue has been reported from other states also. In view of this major outbreak of the disease a "Guideline of Preparation of Contingency Plan in case of outbreak/epidemic of Dengue/Dengue haemorrhagic fever" was prepared and sent to all the states. It includes all the important aspects of control measures like identification of outbreak, demarcation of affected area, containment of outbreak, case management, vector control, IEC activities about Do's and Don't's for prevention of dengue, monitoring and reporting etc.

For early diagnosis ELISA based NSI kits have been introduced under the programme which can detect the cases from 1st day of infection. IgM capture ELISA tests can detect the cases after 5th day of infection.

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The GOI has taken the following steps for prevention and control of dengue-

1. Monitoring the situation through reports received from state health authorities.
2. A mid-term plan for prevention and control of dengue has been developed in 2011 and circulated to the states for implementation. The main components of mid-term plan for prevention and control of dengue are as follows-

a. Surveillance: Disease and entomological surveillance
b. Case management: Laboratory diagnosis and clinical management
c. Vector management: Environmental management for source reduction, chemical control, personal protection and legislation
d. Outbreak response: Epidemic preparedness and media management
e. Capacity building: Training, strengthening human resource and operational research
f. Behavioural change communication Social mobilization, and information, education and communication (IEC)
g. Inter-sectoral coordination: with ministries of urban development, rural development, panchayati raj, surface transport and education sector
h. Monitoring and supervision: Analysis of reports, review, field visit and feed-back

National Chikungunya Control Program

Chikungunya fever is a debilitating non-fatal viral illness, re-emerging in the country after a gap of three decades. Govt. of India is continuously monitoring the situation. Guidelines for prevention and control of the disease have been prepared. For carrying out proactive surveillance and enhancing diagnostic facilities for chikungunya, the 137 sentinel surveillance hospitals involved in dengue in the affected states also carry out chikungunya teats. The diagnostic kits are provided through National Institute of Virology, Pune, by the central government.

National Kala-Azar Control Program (NKCP)

Kala-azar is currently endemic in states of Bihar, Jharkhand, West Bengal and Uttar Pradesh. The trends indicate the growing menace of this disease. There were 17806 cases with 72 deaths in 1986 due to Kala-azar. It rose to 77,102 cases with 1419 deaths in 1992. However, during 1995, it declined to 22,625 cases and 277 deaths, indicating arrest of progress of this disease.

Strategies-

1. Enhanced case detection and complete treatment including introduction of PK39 rapid diagnostic kits and oral drug miltefosine for treatment of Kala-Azar cases.
2. Interruption of transmission through vector control
3. Communication for behavioral impact and intersectoral convergence
4. Capacity building
5. Monitoring, supervision and evaluation
6. Research guidelines on prevention and control of Kala-Azar have been developed and circulated to the states.

The Directorate of National Anti-Malaria Program has a Kala-azar control cell, which monitors the implementation of the control activities in the endemic areas.

This program is making a significant progress. Encouraged by the results of the program, Government of India is envisaging the elimination of Kala-azar by the year 2010. To achieve this goal of elimination, Government of India has decided to provide 100 percent central support from the year 2003–04.

Methods of Control

Integrated Vector Management (IVM) : Ideally, malaria vector control activities should be part of a broader vector control management program. IV Mentails the use of a range of biological, chemical and physical interventions of proven efficacy, separately or in combination, in order to implement cost-effective control and reduce

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reliance on any single intervention. Combinations of a number of methods will compensate for the deficiencies of each individual method. It includes safe use of insecticides and management of insecticide resistance. Rotation of insecticides may be done so as to prolong their effectiveness. It is based on the premise that effective vector control is not the sole preserve responsibility of the health sector but requires the collaboration of various public and private agencies and community participation.

Anti-larval Measures

1. Elimination of breeding places (Source Reduction):

It includes permanent measures such as-

- Filling of low-lying places where water may accumulate.
- This is particularly important for controlling breeding of Anopheles.
- Weekly emptying of household collections of water, particularly to prevent breeding of Aedes.
- Covering drains, ditches, cess pools and sewers near the houses, where Culex breeds.
- Removal of vegetation on shores of slow-moving streams where A. fluviatilis breeds.
- Removal of water plants such as Pistiastratiotes and water hyacinth, manually or by herbicides, checks the breeding of Mansonoides.

2. Larvicidals: The breeding of mosquitoes can be reduced by a variety of physical, chemical and biological methods. Residual effect of larvicides varies considerably with the water quality. The higher dosages are indicated for polluted water. Larvivorous fish are widely used in urban areas, peri-urban areas and freshwater bodies in rural areas. Following methods are being used to control larval stage.

3. Mineral oils: Kerosene, diesel, fuel oil and malariol are used for this purpose. These oils form a thin layer over water, thereby cutting off the oxygen supply to larvae and pupae. They also have probably a direct toxic effect on them. Larvae die within 1-2 hours of application of crude oil. The quantity of oil needed is 40 to 90liter per hectare (one hectare = 10,000 sq m).

4. Paris green (copper acetoarsenite): It is used to kill surface feeding anopheline larvae. It is dusted at the rate of 840 g/ha (one hectare = 100000sq m) of surface. There are no hazards to human beings and livestock at this concentration. Paris green is sprayed over water as dust. This dusting is not effective against culex larvae which are bottom feeders. However, special granular preparations of Paris green are available which are effective against these also.

5. Synthetic insecticides: The most effective larvicides are organ phosphorus compounds like chlorpyriphos, fenthion and Abate, which quickly hydrolyse in water.2 Abate is the least toxic of these and is very effective at a concentration of1 ppm. Organochlorine compounds like DDT and HCH are no longer used as larvicides because of the associated effects like water contamination and emergence of resistant vector strains.

6. Biological control: Following methods are in use as vector control measures—

- Larvivoros fish have been successful and widely used biological control agent against mosquitolarvae in the top water. Two fish namely Gambusia affinis and Poeciliareticulata, (common guppy) have been extensively used for mosquito control in the urban malaria scheme in India under theNational Anti Malaria Program. Gambusiaisa surface feeder, hence it is suitable for feeding on both anophelines and culicines
- Use of biocides: The bacterium Bacillus thuringiensis israelensis (Bti) and B. sphaericus produce toxins which are very effective in killing mosquito and black fly larvae after ingestion. The toxins formulation may be used in water or for the irrigation of food crops to control vector.
- Insect growth regulators (IGRs). These are chemical compounds that are highly toxic to mosquito larvae by preventing their development into adults. Their use has generally been limited due to high cost and

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poor operational acceptability, but may be useful where other compounds cannot be used.

Vector control methods

Antiadult measures :	Antiarval measures :
• Indoor residual with spraying - Orgeno chlorine compound:DDT - OP-compounds : Malathion, Fenitrothion - Carbamate : Propoxur - Synthetic pyrethroids : Deltamethrin	• Larviciding with Petroleum oils, Temephos, Fenthion, etc. • Biological Control -Use of larvivorous fish (Gambusia affinis and Pecilia reticulata)
• Space spray : Pyrithrum	- Use of biocides : Bacillus thuringiensis
• Out door space spray : Malathion, Pyrethrum	Source reduction by environmental management:Drainage/ Filling/flushing/ change of salinity

Anti-adult Measures

Killing : The mosquitoes are killed in two ways by contact poisons:

1. Space spray: Space spraying has been defined as the destruction of flying mosquitoes by contact with insecticides in the air.
2. Indoors residual spraying (IRS): IRS is the application of insecticides to the inner surfaces of dwellings, where endophilic anopheline mosquitoes often rest after taking a blood meal. The main purpose of IRS is to reduce the survival of malaria vector(s) entering houses. DDT has comparatively long residual efficacy (6 months or more) against malaria vectors and plays an important role in the management of vector resistance.

Prevention of Mosquito Bites

1. Use of repellents: Diethyl toluamide (deet) and butylethyl propanediol applied on clothes repels Culex for 6-13 hours. Others in use are DMP, indalone, dimethylcarbate and ethyl hexanediol. They are applied to the exposed parts of the body.
2. Preventing entry into houses: Mosquito-proof wire gauze (6 mesh) is used for this purpose on doors, windows and ventilators.
3. Sleeping in mosquito nets: (6 mesh) and using veils, socks and gloves, etc. as necessary.

In regard to wire gauze and mosquito nets, it should be ensured that the number of holes should be at least about 25 per sq cm (i.e. 5 holes or 5mesh per cm). It is preferable to use a net with 6mesh per cm (15 mesh per inch).

Flies: Though less important than mosquitoes as vectors of disease, the flies have a large variety of species. They may be divided into two groups, the biting and non biting flies. The biting flies include sand fly, tsetse fly, black fly and deer fly. Of these the sand fly is the most important. The common example of a non biting fly is the domestic fly.

The sand flies are responsible for the transmission of Kala Azar (P. argentipes), oriental sore (P. papatasii and P. sergenti) and sand fly fever (P. papatasii and P. punjabensis).

Fly Control Measures

Elimination of breeding places:

1. Sanitary disposal of wastes such as refuse (especially garbage), horse litter and dung, human excreta and sullage water.
2. Food sanitation such as keeping all foods in wire gauze or glass cupboards and containers with well fitting lids.
3. Tight packing of manure in trenches or pits to kill larvae by heat.
4. Provision of cement lined tanks or floors for stocking cow dung so that larvae cannot burrow in the soil to pupate.
5. Breeding is prevented by filling cracks and crevice son the walls and removing any stone or rock piles.
6. The adults are killed by indoor residual spray insecticides like DDT and lindane in concentrations of 1-2 and 0.25 g per square metre respectively.
7. Repellents used on clothes or applied to skin

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such as deet, DMP, etc. are effective against bites.

Prevention of entry: Making the houses fly proof, especially the kitchen and latrines, by putting wire gauze screens in doors and windows.

Trapping: Using a Balfour fly trap made of wire gauze in which the flies enter through a slit to sit on the bait but cannot come out.

Manual killing: Fly swatters are useful devices to kill flies.

National Reproductive and Child Health Program (RCH Program)

Reproductive and child health approach has been defined as "people have the ability to reproduce and regulate their fertility, women are able to go through pregnancy and child birth safely, the outcome of pregnancies is successful in terms of maternal and infant survival and wellbeing, and couples are able to have sexual relations, free of fear of pregnancy and contracting disease".

Highlights of the programme-

1. Integration of all interventions related fertility regulation, maternal and child health and reproductive health.
2. Services to be provided are client oriented, demand driven through decentralized participatory process and target free approach
3. Up-gradation of facilities: creation of First referral units
4. Provision of specialist services for STD and RTI
5. Provision of outreach services for vulnerable groups

The RCH programme has integrated these services and the major intervention are essential obstetric care, 24 hour delivery services at PHCs/ CHCs, emergency obstetric care, medical termination of pregnancy, prevention of reproduction tract infection(RTI) and sexually transmitted diseases(STD) and district surveys.

Essential obstetric care-

1. Early registration of pregnancy within 12 weeks.
2. Provision of minimum three antenatal checkups by ANM or medical officers to monitor progress of the pregnancy and detect any risk/ complication so that appropriate care including referral could be taken in time
3. Provision of safe delivery at home or in an institution.
4. Provision of three postnatal checkups to monitor the postnatal recovery and to detect complication.

24-hour delivery services at PHCs/CHCs-

To promote institutional deliveries, provision has been made to give additional honorarium to the staff to encourage round the clock delivery facilities at health centers.

Complication associated with pregnancy are not always predictable, hence, emergency obstetric care is an important intervention to prevent maternal morbidity and mortality.

Medical termination of pregnancy- MTP is a reproductive measure that enables a woman to opt out of unwanted or unintended pregnancy in certain specific circumstances without endangering her life, through MTP Act 1971. The aim is to reduce maternal morbidity and mortality from unsafe abortions.

Prevention of reproduction tract infection (RTI) and sexually transmitted diseases (STD)- Under RCH programme, the component of RTI/ STD control is linked to HIV and AIDS control. NACO provides assistance for setting up RTI/STD clinics up to the district level.

Reproductive and Child Health Program-II (RCH-II)

RCH-II started in 2005 to improve services quality and achieve Millennium Development Goals by overcoming lacunae in RCH-I, a continuation of RCH-I from 1997 to 2002.

Aim- The aim is to reduce Infant Mortality Rate (IMR), Maternal Mortality Rate (MMR), Total Fertility Rate (TFR) and to increase Couple

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Protection Rate (CPR) and Immunization coverage, especially in rural areas.

Goals

1. Reduction of decadal rate of population growth between 2001 and 2011 to 1.62 percent.
2. Reduction of IMR to <45/1000 livebirths by 2007 and to <30/1000 livebirths by 2010.
3. Reduction of MMR to 1.5/1000 livebirths.
4. Reduction of TFR to 2.1 by 2010.
5. Increase of CPR from 44.8 percent (RHS 2002–03) to 65 percent by 2010.
6. Increase of immunization coverage among children from 48.2 percent (RHS 2002–03) to 100 percent by 2010.
7. Improvement in the coverage of full antenatal care from 44.5 to 89 percent by 2010.
8. Improvement in the coverage of rural institutional deliveries from 39.8 percent (Rural Health Survey 2002– 03) to 80 percent by 2010.

Objectives

- To improve the management performance.
- To develop human resources intensively.
- To expand RCH services to tribal areas also.
- To improve the quality, coverage and effectiveness of the existing family welfare services and essential RCH services with a special focus on the above mentioned EAG states.
- To monitor and evaluate the services.

Components of RCH-II

- Population stabilization
- Maternal health
- Newborn care
- Child health
- Adolescent health
- Control of RTIs/STIs
- Urban health
- Tribal health
- Monitoring and evaluation
- Other priority areas.

ICDS Program

Currently, the most important scheme in the field of child welfare is the ICDS scheme. The blue print for the scheme was prepared by the Department of Social Welfare in 1975.

The population norms for setting up of Anganwadi Centres (AWC) and Mini-AWC have been revised to cover all habitations by SC/ST/ minorities.

For AWCs in rural/urban projects

- One AWC for 400-800 population
- Two AWCs for 800-1600 population
- Three AWCs for 1600-2400 population

Thereafter one AWC for multiples of 800 population. For Mini-AWC, the norm is one mini-AWC for 150 to 400 population.

For tribal/reverine/desert/hilly and other difficult areas

One AWC for 300-800 population

One Mini - AWC for 150-300 population.

Objectives

1. To improve the nutritional and health status of children in the age group 0-6 years;
2. To lay the foundations for proper psychological, physical and social development of the child
3. To reduce mortality and, morbidity, malnutrition and school drop-out;
4. To achieve an effective coordination of policy and implementation among the various departments working for the promotion of child development; and
5. To enhance the capability of the mother and nutritional needs of the child through proper nutrition and health education.

The ICDS seeks to lay a solid foundation for the development of the nation's human resource by providing an integrated package of early childhood services. These consist of

1. Supplementary nutrition- Supplementary nutrition is given to children below 6 years,

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and nursing and expectant mothers from low-income group. The type of food depends upon local availability, type of beneficiary, location of the project etc.

a. each child 6-72 months of age to get 500 calories and 12-15 grams of protein (financial norm of Rs 4.00 per child per day);

b. Severely malnourished child 6-72 months to get 800 calories and 20-25 grams protein (financial norm of Rs 6.00 per child per day); and

c. Each pregnant and nursing woman to get 600 calories and 18-20 grams of protein (financial norm of Rs 5.00 per beneficiary per day.

Under the revised nutritional and feeding norms for supplementary nutrition, state governments/UTs have been mandated to provide more than one meal to the children who come to AWCs, which include providing a morning snack in the form of milk/banana/egg/seasonal fruit/micronutrient fortified food followed by a hot cooked meal. For children below 3 years of age, and pregnant and lactating mothers, "take home ration" is to be provided. All are eligible for availing of the services of ICDS, below poverty line is not a criteria for registration of beneficiaries. The scheme is universal. Supplementary nutrition is given 300 days in a year.

2. Nutrition and health education- It is given to all women in the age group 15-45 years, giving priority to nursing and expectant mothers. It is imparted by specially organized courses in village during home visits by Anganwadi workers.

3. Immunization- Immunization of children against 6 vaccine preventable diseases is being done, while for expectant mothers, immunization against tetanus is recommended.

4. Health check-up – This includes

a. antenatal care of expectant mothers;

b. postnatal care of nursing mother and care of newborn infants;

c. care of children under 6 years of age.

Besides immunization, expectant mothers are given iron and folic acid tablets along with protein supplements. A minimum of 3 physical examinations are done. High risk mothers are referred to appropriate institutions for special care.

The health care of children under 6 years of age consists of:

- Record of weight and height of children at periodical intervals
- Watch over milestones
- Immunization
- General check-up every 3-6 months to detect disease, malnutrition etc.
- Treatment for disease like diarrhoea, dysentery, respiratory tract infections etc. which are widely prevalent.
- Deworming
- Prophylaxis against vitamin A deficiency and anaemia.
- Referral of serious cases to hospital has also been provided for.

5. Medical referral services

6. Nutrition and health education for women and

7. **Non-formal pre-school education-** Non-formal education of children up to the age of 6 years, and pregnant and nursing mothers in rural, urban, slums and tribal areas.

ICDS scheme is designed both as a preventive and development effort. The services of immunization, health check-up and referral services are provided through public health infrastructure i.e., sub-centres, PHC and CHC. The services are provided concurrently.

Beneficiary	Services
Pregnant women	Heath check-up, Immunization against tetanus, Supplementary nutrition, Nutrition and health education
Nursing Mothers	Heath check-up, Immunization against tetanus, Supplementary nutrition, Nutrition and health education
Other women 15-45 years	Nutrition and Health education

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Children less than 3 years	Supplementary nutrition, Immunization, Health check-up, Referral services
Children in age group 3-6 years	Supplementary nutrition, Immunization, Health check-up, Referral services, Non-formal education
Adolescent girls 11-18 years	Supplementary nutrition, Nutrition and health education

Universal Immunization Program

WHO launched the Expanded Programme on Immunization (EPI) in 1974 to protect children against six vaccine-preventable diseases, including diphtheria, whooping cough, tetanus, polio, tuberculosis and measles by 2000.

The programme is currently known as Universal Child Immunisation, 1990. UNICEF sponsored the declaration as part of the United Nations' 40th anniversary celebration in October 1985. It aims to give the EPI global programme more momentum.

The Universal Immunisation Programme, the country's equivalent, was introduced on November 19, 1985, and was honouring Smt. Indira Gandhi at the time. By 1990, the eligible population was to have had all recommended vaccinations, according to the National Health Policy.

Strategies-

1. 100% coverage of expectant mothers with 2 doses of TT
2. At least 85% coverage of infants with 3 doses of DPT, OPV, and one dose each of BCG and Measles by 2000. Although the target was 100% immunization of children but agreed that when coverage reaches a figure of 80% or more.

National Immunization Schedule

Vaccine	When to give	Dose	Route	Site
For Pregnant Women				
TT-1	Early in pregnancy	0.5ml	Intra-muscular	Upper Arm
TT-2	4 weeks after TT-1	0.5ml	Intra-muscular	Upper Arm
TT-Booster	If received 2 TT doses in a pregnancy within the last 3 years	0.5ml	Intra-muscular	Upper Arm
For Infants				
BCG	At birth or as early aspossible till one year of age	0.lml (0.05 ml untill month age)	Intra-dermal	Left Upper Arm
Hepatitis B	At birth or as early aspossible within side of mid-thigh	0.5ml 24 hours	Intra-muscular	Antero-lateral
OPV-0	At birth or as early as possible within the first 15 days	2 drops	Oral	Oral
OPV 1, 2 &3	At 6 weeks, 10 weeks & 14 weeks	2 drops	Oral	Oral
DPT 1, 2 &3	At 6 weeks, 10 weeks & 14 weeks	0.5ml	Intra-muscular	Antero-lateral side of mid-thigh
Hepatitis B1, 2&3	At 6 weeks, 10 weeks & 14 weeks	0.5ml	Intra-muscular	Antero-lateral side of mid-thigh
Measles	9 completed months- 12 months (give up to 5 years if not received at 9-12 months age)	0.5ml	Sub-cutaneous	Right upper Arm

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Vitamin A	At 9 months with measles (1st dose)	1 ml (1 lakh IU)	Oral	Oral
For Children				
DPT booster	16-24 months	0.5 ml	Intra-muscular	Antero-lateral side of mid-thigh
OPV Booster	16-24 months	2 drops	Oral	Oral
Measles (2nd dose)	16-24 months	0.5 ml	Sub-cutaneous	Right upper Arm
Japanese Encephalitis	16-24 months with DPT/OPV booster	0.5 ml	Sub-cutaneous	Left Upper Arm
Vitamin A(2nd to 9th dose)	16 months with DPT/OPV booster. Then, one dose every 6 months up to the age of 5 years.	2ml (2 lakh IU)	Oral	Oral
TT Booster	5-6 years 10 years and 16 years	0.5ml 0.5ml	Intra-muscular Intra-muscular	Upper Arm Upper Arm

Vaccines that can be given after discussion with parents

- Varicella-15 months (or after 1 year}
- Hepatitis A-high-risk selected infants, 18 months, and 6 months later
- Pneumococcal conjugate vaccine- 6 weeks
- Influenza vaccine- 6 months of age to high risk selected infants annually

National Mental Health Programme

The National Mental Health Programme was launched during 1982 with a view to ensure availability of Mental Health Care Services for all, especially the community at risk and underprivileged section of the population, to encourage application of mental health knowledge in general health care and social development. A National Advisory Group on mental health was constituted under the Chairmanship of the Secretary, Ministry of Health and Family Welfare for the effective implementation of the National Health Programme. Eleven institutions have been identified for. imparting training in basic knowledge and skills in the field of mental health to the primary health care physicians and paramedical personnel. At present this programme covers 94 districts.

Aims of the NMHP

1. Prevention and treatment of mental and neurological disorders and their associated disabilities.
2. Use of mental health technology to improve general health services; and
3. Application of mental health principles in total national development to improve quality of life.

Objectives

1. To ensure availability and accessibility of minimum mental health care for all in the foreseeable future, particularly to the most vulnerable and underprivileged sections of population.
2. To encourage application of mental health knowledge in general health care and in the social development.
3. To promote community participation in the mental health services development, and to stimulate efforts towards self-help in the community.

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The programme strategies

1. Integration of mental health with primary health care through the NMHP;
2. Provision of tertiary care institutions for treatment of mental disorders;
3. Eradicating stigmatization of mentally ill patients and protecting their rights through regulatory institutions like the Central Mental Health Authority, and State Mental Health Authority.

District Mental Health Programme components

1. Training programmes of all workers in the mental health team at the identified nodal institute in the state;
2. Public education in mental health to increase awareness and to reduce stigma;
3. For early detection and treatment, the OPD and indoor services are provided; and
4. Providing valuable data and experience at the level of community to the state and centre for future planning, improvement in service and research.

District Mental Health Programme has now incorporated promotive and preventive activities for positive mental health which includes:

- School mental health services: Life skills education in schools, counselling services.
- College counselling services: Through trained teachers/counsellors.
- Work place stress management: Formal & Informal sectors, including farmers, women etc.
- Suicide prevention services: Counselling centre at district level, sensitization workshops, IEC, help lines etc.

The National Human Rights Commission also monitors the conditions in the mental hospitals along with the government of India, and the states are acting on the recommendations of the joint studies conducted to ensure quality in delivery of mental care.

National Program for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases & Stroke (NPCDCS)

With a huge and growing burden of chronic non-communicable diseases (NCDs), particularly cardiovascular disease, diabetes mellitus, cancer, stroke, and chronic lung diseases, India is going through a rapid health revolution. According to estimates, 53% of deaths in 2005 were due to NCDs.

The National Programme on Prevention and Control of Diabetes, Cardiovascular Diseases, and Stroke was envisioned due to the fact that NCDs are outpacing communicable diseases in India and the current health system is mostly focused on communicable diseases. The National initiative for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS) was created later after this initiative was combined with the National Cancer Control Programme.

The programme focuses on the health promotion, capacity building including human resource development, early diagnosis and management of these diseases with integration with the primary health care system.

Objectives

1. To prevent and control common NCDs through behaviour and lifestyle changes.
2. To provide early diagnosis and management of common NCDs.
3. To build capacity at various levels of health care for prevention, diagnosis and treatment of common NCDs.
4. To train human resource within the public health setup, viz doctors, paramedics and nursing staff to cope up with the increasing burden of NCDs.
5. To establish and develop capacity for palliative and rehabilitative care.

The programme is to be implemented in 20,000 sub-centres and 700 community health centres (CHCs) in100 districts across 21 States/UTs and

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he strategies include promoting healthy lifestyle hrough massive health education and mass media efforts at country level, opportunistic screening of persons above the age of 30 years, establishment of Non-Communicable Disease (NCD) Clinic at Community Health Centre (CHC) and District level, development of trained manpower and strengthening of tertiary level health facilities.

The various approaches such as mass media, community education and interpersonal communication will be used for behavioural change focusing on the following messages:

- Increased intake of healthy foods
- Increased physical activity
- Avoidance of tobacco and alcohol
- Stress management.

Cancer component under NPCDCS

Cancer is an important public health problem in India, with nearly 10 lakh new cases occurring every year in the country. It is estimated that there are 2.8 million cases of cancer in the country at any given point of time. With the objectives of prevention, early diagnosis and treatment, the national cancer control programme was launched in 1975-76.

Objectives

1. Primary prevention of cancers by health education;
2. Secondary prevention i.e., early detection and diagnosis of common cancer such as cancer of cervix, mouth, breast and tobacco related cancer by screening/self-examination method; and
3. Tertiary prevention i.e., strengthening of the existing institutions. of comprehensive therapy including palliative care.

New schemes

1. **Scheme for district project-** The scheme envisages carrying out IEC activities (i.e. cancer education), early detection and pain relief measures, by providing one time financial assistance of 15 lakhs to State Governments for each district project selected.
2. **Development of oncology wings.** The oncology department in the medical colleges are provided financial assistance up to 1 crore for the purchase of cobalt therapy units, brachytherapy unit, linear accelerator and for undertaking mammography.
3. **Financial assistance to NGO's-** Assistance up to 5 lakhs to voluntary organizations is provided on recommendation by the State Government for carrying out cancer education and detection activities, preferably in rural areas and urban slums. Assistance was given to 33 NGOs.

Swachha Bharat Mission

To accelerate the efforts to achieve universal sanitation coverage and to put the focus on sanitation, the Prime Minister of India had launched the Swachh Bharat Mission on 2nd October 2014. Under the mission, all villages, Gram Panchayats, Districts, States and Union Territories in India declared themselves "open-defecation free" (ODF) by 2 October 2019, the 150th birth anniversary of Mahatma Gandhi, by constructing over 100 million toilets in rural India.

Vision

The aim of Swachh Bharat Mission (Gramin) phase II is to ensure the open defecation free behaviours are sustained

Objectives

1. Open defecation free behaviours are sustained and no one is left behind.
2. Solid and liquid waste management facilities are accessible and reinforcing ODF behaviours and focus on providing interventions for safe management of solid and liquid waste in villages
3. To encourage cost effective and appropriate technologies for ecologically safe and sustainable sanitation.
4. To develop, wherever required, community managed sanitation systems focusing on scientific Solid & Liquid Waste Management

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systems for overall cleanliness in the rural areas.

Ayushman Bharat Yojana (National Health Protection Scheme)

"Ayushman Bharat - National Health Protection Scheme" which will cover over 10 crore poor and vulnerable families (approximately 50 crore beneficiaries) providing coverage up to 5 lakh rupees per family per year for secondary and tertiary care hospitalization.

Prime Minister Narendra Modi launch programmes of Ayushman Bharat National Health Protection Mission in Chhattisgarh on Ambedkar Jayanti 14/5/2018.

AB-NHPM will subsume the on-going centrally sponsored schemes Rashtriya Swasthya Bima Yojana (RSBY) and the Senior Citizen Health Insurance Scheme (SCHIS).

Salient Features

- Ayushman Bharat - National Health Protection Mission will have a defined benefit cover of Rs. 5 lakh per family per year.
- Benefits of the scheme are portable across the country and a beneficiary covered under the scheme will be allowed to take cashless benefits from any public/private empanelled hospitals across the country.
- Ayushman Bharat National Health Protection Mission will be an entitlement based scheme with entitlement decided on the basis of deprivation criteria in the SECC database.

The different categories in rural area include-

- Families having only one room with kucha walls and kucha roof;
- Families having no adult member between age 16 to 59;
- Female headed households with no adult male member between age 16 to 59:
- Disabled member and no able bodied adult member in the family;
- SC/ST households; and landless households deriving major part of their income from manual casual labour.
- Also, automatically included families in rural areas having any one of the following: households without shelter, destitute, living on alms, manual scavenger families, primitive tribal groups, legally released bonded labour.
- For urban areas, 11 defined occupational categories are entitled under the scheme
- States would need to have State Health Agency (SHA) to implement the scheme.
- To ensure that the funds reach SHA on time, the transfer of funds from Central Government through Ayushman Bharat - National Health Protection Mission to State Health Agencies may be done through an escrow account directly.
- In partnership with NITI Aayog, a robust, modular, scalable and interoperable IT platform will be made operational which will entail a paperless, cashless transaction.

Ayushman Bharat Digital Mission

The Ayushman Bharat Digital Mission (ABDM) aims to develop the backbone necessary to support the integrated digital health infrastructure of the country. It will bridge the existing gap amongst different stakeholders of Healthcare ecosystem through digital highways.

Vision

To create a national digital health ecosystem that supports universal health coverage in an efficient, accessible, inclusive, affordable, timely and safe manner, that provides a wide-range of data, information and infrastructure services, duly leveraging open, interoperable, standards-based digital systems, and ensures the security, confidentiality and privacy of health-related personal information.

Objectives- To strengthen the accessibility and equity of health services, including continuum of care with citizen as the owner of data, in a holistic healthcare programme approach leveraging IT & associated technologies and support the existing health systems in a 'citizen-centric' approach, the Ayushman Bharat Digital Mission (ABDM) envisages the following specific objectives:

1. To establish state-of-the-art digital health

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systems, to manage the core digital health data, and the infrastructure required for its seamless exchange;

2. To establish registries at appropriate level to create single source of truth in respect of clinical establishments, healthcare professionals, health workers, drugs and pharmacies;
3. To enforce adoption of open standards by all national digital health stakeholders;
4. To create a system of personal health records, based on international standards, easily accessible to individuals and healthcare professionals and services providers, based on individual's informed consent;
5. To promote development of enterprise-class health application systems with a special focus on achieving the Sustainable Development Goals for health;
6. To adopt the best principles of cooperative federalism while working with the States and Union Territories for the realization of the vision;
7. To ensure that the healthcare institutions and professionals in the private sector participate actively with public health authorities in the building of the Ayushman Bharat Digital Mission (ABDM), through a combination of prescription and promotion;
8. To ensure national portability in the provision of health services;
9. To promote the use of clinical decision support (CDS) systems by health professionals and practitioners;
10. To promote a better management of the health sector leveraging health data analytics and medical research;
11. To provide for enhancing the efficiency and effectiveness of governance at all levels;
12. To support effective steps being taken for ensuring quality of healthcare; and
13. To strengthen existing health information systems, by ensuring their conformity with the defined standards and integration with the proposed Ayushman Bharat Digital Mission (ABDM).

Features of the Mission

1. **Health ID:** It will be issued for every citizen that will also work as their health account. This health account will contain details of every test, every disease, the doctors visited, the medicines taken and the diagnosis. Health ID is free of cost, voluntary. It will help in doing analysis of health data and lead to better planning, budgeting and implementation for health programs.
2. **Healthcare Facilities & Professionals' Registry: -** The other major component of the programme is creating a Healthcare Professionals' Registry (HPR) and Healthcare Facilities Registry (HFR), allowing easy electronic access to medical professionals and health infrastructure. The HPR will be a comprehensive repository of all healthcare professionals involved in delivering healthcare services across both modern and traditional systems of medicine. The HFR database will have records of all the country's health facilities.
3. **Ayushman Bharat Digital Mission Sandbox:** The Sandbox, created as a part of the mission, will act as a framework for technology and product testing that will help organisations, including private players intending to be a part of the national digital health ecosystem become a Health Information Provider or Health

Information User or efficiently link with building blocks of Ayushman Bharat Digital Mission.

Implementing Agency: National Health Authority (NHA) under the Ministry of Health and Family Welfare.

Expected Benefits

1. Ensure ease of doing business for doctors and hospitals and healthcare service providers.
2. Enable access and exchange of longitudinal health records of citizens with their consent.
3. Create integration within the digital health

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ecosystem, similar to the role played by the Unified Payments Interface (UPI) in revolutionising payments.

National Health Mission (NRHM & NUHM)

The Ministry of Health and Family Welfare is putting into action a number of national programmes, policies, and schemes to ensure that everyone has access to high-quality healthcare. The strategy is to improve the infrastructure in current institutions and develop new facilities in underserved areas in order to increase access to the decentralised health system. The National Health Mission (NHM), which includes the National Rural Health Mission (NRHM) and the National Urban Health Mission (NUHM) as its two sub-Missions, has been created as part of the plan process by combining a variety of programmes under one banner.

It was decided to launch the National Health Mission in May 2013. Reproductive, Maternal, Newborn, Child and Adolescent Health (RMNCH+A), Control of Communicable and Noncommunicable Diseases, and Strengthening of Health Systems in Rural and Urban Areas are the key programmatic components. The significant drop in out-of-pocket payments from 72% to 60% is one of NHM's major accomplishments.

Recently, new NHM initiatives have been introduced. Rashtriya Bal Swasthya Karyakram (RBSK) was established to offer complete healthcare and enhance children's quality of life through the early detection of diseases, deficiencies, and developmental delays, including disabilities. Rashtriya Kishor Swasthya Karyakram (RKSK) is a different initiative that was started in order to address the health needs of the 253 million adolescents, or more than 21% of the country's population, in a comprehensive manner. It does this by incorporating a number of new aspects, such as mental health, nutrition, substance abuse, injuries and violence, and non-communicable diseases.

Adolescent anaemia was the focus of the launch of the Supplementation Programme (WIFS). Adolescents in both rural and urban regions of the nation between the ages of 10 and 19 are given supervised Iron-Folic Acid (IFA) tablets as part of this project. NHM is a step towards the nation's goal of achieving universal health care.

National Urban Health Mission (NUHM)

The National Urban Health Mission (NUHM) was established during the eleventh five-year plan (2008–2012) to address the health needs of the urban poor, in particular slum dwellers, through primary healthcare services by investing in high calibre medical personnel, appropriate technology through public–private partnerships, and health insurance.

All cities with a population greater than 100,000 are included in this. It includes slum residents as well as other marginalised urban residents who may live in slums or work on construction sites, such as rickshaw pullers, street sellers, railway and bus station coolies, homeless persons, and children living on the streets.

Goal

It is to improve the health status of the poor by:

- Facilitating equitable access to quality health care
- Revising public health system
- Building public private partnership
- Community based risk pooling and insurance mechanism
- Active involvement of the urban local bodies.

Strategies

1. Strengthening urban primary health structure:

a. By creating new urban health centers, each covering a slum population of 20,000 to 30,000.

b. Provision of evening OPD.

c. Provision of comprehensive health care (preventive, promotive and curative care).

d. Provision of need based equipment, drugs and human resources.

e. Provision of Rogi Kalyan Samiti.

f. Provision of outreach health sessions in the slums.

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g. Using GIS map, for easy access of patients.
2. Strengthening community participation, improving health awareness and capacity building, through partnership with nongovernment providers.
3. Establishment of Mahila Arogya Samiti (MAS).
4. Appointment of Urban Social Health Activist (USHA).
5. Capacity building of stake holders.
6. Prioritizing the most vulnerable amongst the poor like destitute, beggars, street children, construction workers, coolies, rickshaw pullers, sex workers, street vendors and such others.
7. Ensuring quality health care services by defining Indian Public Health Standards suitably modified for urban areas, defining parameters for accreditation of nongovernment providers, developing capacity of both public and private providers, encouraging the acceptance and enforcement of local public health Acts and encouraging development of standard treatment protocols.

Urban Social Health Activist (USHA)

She is a resident woman of the same slum, studied at least up to 8th standard, preferably in the age group of 25–45 years, married/widowed/divorced, chosen by Urban Local Body (ULB) counsellors.

Functions of USHA

1. To promote good health practices in her area
2. To facilitate awareness on RCH services
3. To motivate all types of family planning methods
4. To register all pregnant mothers and to motivate them for antenatal care
5. To act as a Depot holder for essential provisions like ORS packets, IFA tablets, chloroquine tablets, oral pills, condoms, etc.
6. To support ANM/MAS (Mahila Arogya Samiti) in conducting monthly outreach session regularly
7. To form and promote Mahila Arogya Samiti
8. To escort the patients requiring health services
9. To encourage the community participation in health activities
10. To maintain the records of vital events in her area
11. To treat minor ailments with the drug kit provided.

Functions of Mahila Arogya Samiti

1. To focus on preventive and promotive care
2. To act as peer education group
3. To facilitate access to identified facilities
4. Community monitoring and referral
5. Risk pooling fund and health insurance.

National Rural Health Mission (NRHM)

The Indian government launched the "National Rural Health Mission" (NRHM) on April 5, 2005, for a period of seven years (2005–2012), and recently extended it up to the year 2017. This was done in recognition of the significance of health in the process of economic and social development and to improve the quality of life for its citizens.

National Rural Health Mission-A Vision

1. To provide effective health care services to rural population, especially to mothers and children with initial focus on 18 states
2. To raise the public health expenditure from 0.9 percent of
3. GDP in 1999 to 2.3 percent of GDP
4. To undertake architectural correction in health care delivery system
5. To provide services through the appointment of Accredited Social Health Activist (ASHA) in each village
6. To strengthen the rural hospitals to meet public health standards
7. To integrate national health programs
8. To mainstream AYUSH
9. To decentralize village and district level health planning and management
10. To define time bound goals
11. To seek access of rural people (especially poor mothers and children) to equitable, affordable, accountable and effective primary health care
12. To provide improved health care services

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under Janani Suraksha Yojana (JSY) for the Below Poverty Line families.

Goals

1. Reduction of Infant Mortality Rate (IMR) and Maternal Mortality Ratio (MMR)
2. Universal access to public health services such as women's health, child health, safe drinking water, sanitation and hygiene, immunization and nutrition
3. Prevention and control of communicable and noncommunicable diseases including locally endemic diseases
4. Access to integrated comprehensive primary health care Population stabilization, gender and demographic balance
5. Revitalize local health traditions and mainstream AYUSH
6. Promotion of healthy life-styles.

Strategies

Core Strategies :

1. To enhance the capacity of Panchayati Raj Institutions (PRIs) to manage public health services
2. To promote access of improved health care at household level through female Accredited Social Health Activist (ASHA)
3. To make health plan for each village through Village Health Committee of the Panchayat
4. To strengthen subcenter by more multipurpose workers
5. To strengthen existing PHCs and CHCs
6. To provide one Community Health Center of 30 to 50 bed strength per lakh population
7. To prepare and implement an Intersectoral District Health Plan, prepared by District Health Mission
8. To integrate Vertical Health Programs and Family Welfare Programs
9. To provide technical support to Health Missions at National, State and District levels for public health Management
10. To formulate transparent policies for deployment and career development of Human Resources for health
11. To promote healthy life-styles such as reduction in consumption of tobacco, alcohol, etc.

Supplementary Strategies

1. To regulate private sector, including the rural practitioners, to ensure availability of quality service to the people at reasonable cost
2. To promote public-private partnership to achieve public health goals
3. To mainstream AYUSH
4. To Reorient Medical Education (ROME) to support rural health issues
5. To introduce effective risk pooling mechanisms and social insurance to provide health security of the poor.

National AYUSH Mission (NAM)

The National AYUSH Mission (NAM), which will be carried out by States and UTs, was launched during the 12th Plan by the Department of AYUSH in the Ministry of Health and Family Welfare of India. The main goal of NAM is to support AYUSH medical systems by developing educational systems, enforcing quality control of Ayurvedic, Siddha, Unani, and Homoeopathic (ASU &H) medications, and ensuring the long-term availability of ASU & H raw materials. It envisions a flexible approach to programme implementation that will result in a significant level of State Government/UT participation. The NAM envisions the creation of both a National Mission and equivalent Missions at the State level. NAM is likely to improve significantly the Department's outreach in terms of planning, supervision and monitoring of the schemes.

Vision

1. To provide cost effective and equitable AYUSH health care throughout the country by improving access to the services.
2. To revitalize and strengthen the AYUSH systems making them as prominent medical streams in addressing the health care of the society.
3. To improve educational institutions capable of imparting quality AYUSH and AYUSH education
4. To promote the adoption of Quality standards of

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AYUSH drugs and making available the sustained supply of AYUSH raw-materials.

Objectives

1. To provide cost effective AYUSH Services, with a universal access through upgrading AYUSH Hospitals and Dispensaries, co-location of AYUSH facilities at Primary Health Centres (PHCs), Community Health Centres (CHCs) and District Hospitals (DHs).
2. To strengthen institutional capacity at the state level through upgrading AYUSH educational institutions, State Govt. ASU&H Pharmacies, Drug Testing Laboratories and ASU & H enforcement mechanism.
3. Support cultivation of medicinal plants by adopting Good Agricultural Practices (GAPs) so as to provide sustained supply of quality raw- materials and support certification mechanism for quality standards, Good Agricultural/Collection/Storage Practices.
4. Support setting up of clusters through convergence of cultivation, warehousing, value addition and marketing and development of infrastructure for entrepreneurs.

Components of the Mission

Mandatory Components :

1. AYUSH Services
2. AYUSH Educational Institutions
3. Quality Control of ASU &H Drugs
4. Medicinal Plants

Flexible Components

1. AYUSH Wellness Centres including Yoga & Naturopathy
2. Tele-medicine
3. Sports Medicine through AYUSH
4. Innovations in AYUSH including Public Private Partnership
5. Reimbursement of Testing charges
6. IEC activities
7. Research & Development in areas related to Medicinal Plants
8. Voluntary certification scheme: Project based.
9. Market Promotion, Market intelligence & buy back interventions
10. Crop Insurance for Medicinal Plants

National Nutrition Programs

The governments of India have initiated several large-scale supplementary feeding programmes and programmes aimed at overcoming specific deficiency diseases through various ministries to combat nutrition.

National Iodine Deficiency Disorders Control Program

The National Goiter Control Program, initiated in 1962, focused on universal iodization of common salt for goiter control. However, the program faced difficulties in production and sales. Goiter prevalence remained high, and iodine deficiency disorders affected a wider spectrum of life events, including still-births, abortions, mental retardation, deafmutism, and neuromotor defects. The prevalence rate of iodine deficiency disorders is 10%, with 167 million people exposed to the risk, with 71 million already suffering from various manifestations.

Government of India upgraded National Goiter Control Program to NIDDCP in 1992, focusing on iodized salt for control and prevention.

Aim

To reduce the prevalence of IDD:

1. To less than 10 percent among adults, by 2010
2. To less than 5 percent among children 10 to 14 years
3. To zero percent of cretins among the newborns by the year 2000.

Objectives

1. To assess the magnitude of the IDD problem in the country
2. To assess the impact of control measures after every five years
3. To monitor the quality of iodized salt available to consumers and estimate their urinary iodine excretion pattern
4. To conduct IEC campaigns for promoting community participation in the implementation of the program.

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National Iron Plus Initiative for Anaemia Control

The ministry of health and family welfare, government of India has launched the weekly Iron and Folic acid supplementation (WIFS) programme to reduce the prevalence and severity of nutritional anaemia in adolescent population (10-19 years) and National Iron Plus Initiative (NIPI) for age group 6 months to 10 years.

National Iron Plus Initiative (NIPI) is comes under Poshan Abhiyan. Prime minister overarching for holistic nourishment.

Target groups

1. Weekly Iron and Folic Acid Supplementation (WIFS) programme will be planned and implemented for the following two target groups in both rural and urban area:
   - Adolescent girls and boys enrolled in govt./ govt. aided schools from 6th to 12th class
   - Adolescent girls who are not in school through AWC.
2. National iron plus initiative
   - Girls and boys enrolled in government school/ government aided schools from 1st to 5th class
   - 6 months to 60 months children through AWC.

Vision- Anaemia Mukt Bharat.

Objective- Decrease Anaemia prevalence by 18% in all target by 2022.

Anemia Mukt Bharat (6X6X6 Strategy)

Six Beneficiaries-

1. 6-59 months (Child).
2. 05-9 years.
3. Adolescents male and female (15-19 years).
4. Female of reproductive age group (20-45 years), who are not non pregnant/ non lactating.
5. Pregnant female.
6. Lactating w omen.

Six Interventions

1. Prophylactic IFA Supplementation.
2. Deworming
3. Intensified year-round behaviour change communication campaign
4. Treating of anaemia using digital methods and patient care.
5. Mandatory provision of IFA fortified food in public health programme.
6. Addressing non nutritional cause of anaemia in endemic area like malaria, fluorosis, sickle cell anaemia.

Six Interventions Mechanism

1. Fixed day
2. Institution Based
3. Supervised consumption
4. Educating correct dietary practices and increasing iron intake,
5. Screening for moderate /severe anaemia and referring,
6. Annual / Biannual deworming

Albendazole is contraindicated in 1st trimester and can be given in 2nd and 3rd trimester. DOC in 1st trimester is Mebendazole 100 mg BD for 3 days.

Age Group	Dose/week	Formulation	Dosing iron (mg)	Folic acid (ug)	Colour
6-59 months	Biweekly	Liquid	20	100	N/A
5-9 years	Weekly	Tablet	45	400	Pink
10-19 years	Weekly	Tablet	100	500	Blue
20-44 years (non-pregnant / non lactating)	Weekly	Tablet	60	400	Red
Pregnant and lactating	Daily	Tablet	60	500	Red

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This programme was launched by the ministry of health and family welfare in 1970. On the basis of technology developed at national institute of nutrition, Hyderabad.

This programme has been initiated to prevent night blindness by giving vitamin-A

It is short term, simple technology based on 6-9 months and liberated slowly.

Administer a single massive dose of 2,00,000 IU of vitamin –A in oil orally every 6 month to preschool children (1 to 6 yrs.) and half that dose (1,00,000 IU) to children between 6 month to 1 year of age. This programme implemented through peripheral health worker.

Mid-Day Meal Program

This is also known as school lunch programme. It has been in operation since 1961 throughout the country under the ministry of education.

The objective of this programme is to attract more children for admission to schools and retain them so that literacy improvement of children.

Principles of Mid-day meal formulation-

1. The meal should be supplement and not a substitute to the home diet.
2. The meal should supply at least 1/3rd of the total energy requirement and half of the protein need.
3. The cost of the meal should be reasonably.
4. The meals should be such that it can be prepared easily in schools, no complication cooking process should be involved.
5. As for as possible, locally available foods should be used, this will reduce the cost of the meal.
6. The menu should be frequently changed to avoid monotony.
7. The meal should be provided through their own cafeteria on a 'No profit no loss' basis.

A. mid-day school meal -

Food stuff	Gm/day/child
Cereals and millets	75
Pulses	30
Leafy vegetables	30
Non- leafy vegetables	30
Oil and fats	08
Milk	150 ml

Balwadi Nutrition Program

This programme is under ministry of social welfare it was started in 1970 for the benefit of children in the age group 3-6 years in rural areas.

This programme is implemented through Balwadi which also provide pre-primary education to the children. The food supplement provides 300 kcal and 10 gms of protein per day per children. This is also merged with ICDS scheme since 1975.

MCQ on National Health Programme

1. In RNTCP the schedule for sputum examination for category I patients is:
   (a) 2, 3 and 5 months
   (b) 2, 4 and 6 months
   (c) 1, 3 and 5 months
   (d) 2, 5 and 7 months
2. Multidrug resistance in TB is defined as resistance to:
   (a) Streptomycin, Rifampicin and Isoniazid
   (b) Streptomycin and Rifampicin
   (c) Isoniazid and Rifampicin
   (d) Streptomycin and Isoniazid
3. Every TB sputum positive patient can infect up to:
   (a) 1-2 persons per year
   (b) 5-6 persons per year
   (c) 10-15 persons per year
   (d) 100-200 persons per year
4. 'DOTS' indicates:
   (a) Short-term treatment under supervision
   (b) Short-term treatment without supervision

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(c) Long-term treatment with supervision
(d) Long-term treatment without supervision

5. Which is included in RNTCP EXCEPT:
(a) Active case finding
(b) Directly observed
(c) X-ray is diagnostic
(d) Drugs given daily

6. Diagnosis of TB according to DOTS (RNTCP) is:
(a) 1 out of 2 samples positive
(b) 2 out of 3 samples positive
(c) 3 out of 3 samples positive
(d) None

7. Drugs are used in AKT-4 kit for TB as:
(a) Decrease in resistance by mutation
(b) Decrease in resistance by conjugation
(c) To cure disease early
(d) None

8. DOTS criteria for TB is positive if:
(a) 1 out of 2 sputum positive
(b) 2 out of 3 sputum positive
(c) CxR positive
(d) Mantoux positive

9. According to RNTCP,the first action to be taken in a person with cough of more than three weeks with one sample of sputum positive?
(a) Star antibiotics for 15 days
(b) Chest X-ray
(c) Sputum sample for AFB
(d) Culture study

10. Pulse polio immunization is administration of OPV to:
(a) All children between 0—5 years of age on a single day, irrespective of their previous immunization status
(b) Children in the age group of 0—1 year only who have not been immunized earlier
(c) Children in the age group of 12—24 months only, as the booster dose
(d) All children between 0—5 years of age, whenever there is an outbreak of poliomyelitis

11. Target group for pulse polio immunization is
(a) 0-1 years (b) 0-3 years
(c) 0-5 years (d) 0-10 years

12. OPV Vaccine type:
(a) Killed (b) Live
(c) Toxoid (d) None

13. Pulse polio immunization covers:
(a) 0-5 yrs children
(b) 0-1 yrs children
(c) 1-5 yrs children
(d) 0-2 yrs children

14. Integrated Management of Neonatal and Childhood Illness (IMNCI) includes all except:
(a) Malaria
(b) Respiratory infections
(c) Diarrhoea
(d) Tuberculosis

15. Essential components of RCH Programme in India include all of the following except:
(a) Prevention and management of unwanted pregnancies
(b) Maternal care including antenatal, delivery and postnatal services
(c) Reduce the under five mortality to half
(d) Management of reproductive tract infections and sexually transmitted infections

16. 'Seven Cleans' of safe and hygienic birth practices include:
(a) Clean walls and Clean floor
(b) Clean towel and Clean water for hand washing
(c) Clean birth canal and Clean cord surface
(d) Clean mind and Clean environment

17. RCH-II (2004-09) has set the goal of achieving a Couple Protection Rate of:
(a) 48% (b) 60%
(c) 65% (d) 100%

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18. Elemental iron and folic acid contents of pediatric ironfolic acid tablets supplied under Reproductive and Child Health (RCH) Programme are:
    (a) 20 mg iron and 100 micrograms folic acid
    (b) 40 mg iron and 100 micrograms folic acid
    (c) 40 mg iron and 50 micrograms folic acid
    (d) 60 mg iron and 100 micrograms folic acid
19. RCH phase 2 does not include
    (a) Immunization of pregnant women
    (b) Treatment of STD/RTI
    (c) Feed to malnourished children
    (d) Early registration of pregnancy upto 12-16 weeks
20. Components of RCH elaborated include
    (a) Prevention of STD (b) Family planning
    (c) Child survival (d) All of the above
21. RCH II includes:
    (a) Low osmolar ors
    (b) Adolescent health
    (c) Exclusive breast feeding
    (d) All
22. According to maternal health programme the daily dose of folic acid for pregnant women should be:
    (a) 100 mcg (b) 200 mcg
    (c) 300 mcg (d) 400 mcg
23. Under the National Programme for Control of Blindness in India, medical colleges are classified as eye care centers of:
    (a) Primary level (b) Secondary level
    (c) Tertiary level (d) Intermediate level
24. According to the World Health Organization, the definition of blindness is:
    (a) Visual acuity < 6/60 in the better eye with available correction
    (b) Visual acuity <3/60 in the better eye with available correction
    (c) Visual acuity < 6/60 in the better eye with best Correction
    (d) Visual acuity < 3/60 in the better eye with best correction
25. Match the following NPCB categories of Visual impairment and Blindness:

A < 6/18 to 6/60,	I - Economic Blindness
B < 6/60 to 3/60,	II - Manifest Blindness
C < 3/60 to 1/60,	III - Social Blindness
D < 1/60 to perce- ption of light,	IV - Low Vision

    (a) A-II, B-IV, C-III, D-I
    (b) A-I, B-II, C-IV, D-IV
    (c) A-IV, B-I, C-III, D-II
    (d) A-IV, B-II, C-III, D-I
26. All of the following are given global prominence in the VISION 2020 goals, except:
    (a) Refractive errors (b) Cataract
    (c) Trachoma (d) Glaucoma
27. Which of the following diseases is not included in "Vision 2020 - Right to Sight" immediate goals?
    (a) Cataract
    (b) Epidemic conjunctivitis
    (c) Onchocerciasis
    (d) Trachoma
28. In vision 2020, recommended ophthalmic personnel per population ratio is
    (a) 5000 (b) 10000
    (c) 50000 (d) 100,000
29. "3 BY 5 target" approach refers to:
    (a) Providing 3 ART drugs to all patients by 2005
    (b) Providing ART to 3 million people by 2005
    (c) Providing 3 antiretroviral drugs to all patients
    (d) All of above
30. For diagnosis of HIV infection in asymptomatic, minimum number of tests required is/are:
    (a) 1 (b) 2
    (c) 3 (d) 4
31. Route for HIV transmission with maximum efficiency is:
    (a) Sexual
    (b) Transfusion of blood/blood products

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(c) Sharing needles/syringes
(d) Mother to child transmission

32. To prevent vertical transmission of HIV in a child of pregnant mother, used is:
(a) Single dose of Nevirapine mother and child
(b) Zidovudine for 3 months
(c) Observation
(d) Zidovudine for 6 months

33. Helpline for AIDS can be reached by dialling:
(a) 1079 (b) 1091
(c) 1098 (d) 1097

34. For prevention of mother to child transmission of HIV infection the dose of nevirapine to be given to the mother at the onset of labour is:
(a) 200mg (b) 300mg
(c) 500mg (d) 750mg

35. All of the following are activities in Modified Plan of Operation in areas where API is less than 2, except:
(a) Active and passive surveillance every fortnight
(b) Insecticidal spray with rounds of HCH every 6 weeks
(c) Radical treatment of all cases detected
(d) Mass surveys

36. Which of the following is not reported in India?
(a) Plasmodium vivax
(b) Plasmodium falciparum
(c) Plasmodium ovale
(d) Plasmodium malariae

37. An index of operational efficiency of the malaria control programme is:
(a) Annual parasite incidence
(b) Annual blood examination rate
(c) Slide positivity rate
(d) Human blood index

38. NVBDCP does not include
(a) Malaria
(b) Filariasis
(c) Cholera
(d) Chikungunya fever

39. Urban malaria scheme is based on:
(a) API levels
(b) Anti-adult measures
(c) Anti-larval measures
(d) Drug based treatment

40. Most efficient anti-larval measure to prevent urban malaria is:
(a) Clean drainage and sewerage systems
(b) Cover overhead tanks properly
(c) Filling cesspools and ditches
(d) Cover pits

41. According to NMEP, malaria surveillance should be done every:
(a) Fortnightly (b) Yearly
(c) Monthly (d) Weekly

42. About ASHA (Accredited Social Health Activist) true is all except:
(a) They are preferably females
(b) There is one ASHA worker per 1000 population
(c) ASHA is skilled birth attendant
(d) Provides primary medical care for minor ailments

43. Under National Rural Health Mission, ASHA stands for:
(a) A Social Health Agent
(b) A Specific Health Agent
(c) Accredited Social Health Activist
(d) Advanced Scientific Health Activist

44. Under National Rural Health Mission, lowest level at which Health Action Plan is prepared is:
(a) State level (b) District Level
(c) Subcentre Level (d) Village Level

45. Which of the following is the 'Impact indicator' for evaluation of ASHA's performance?
(a) Number of meetings attended
(b) Number of institutional deliveries
(c) Reduction in infant mortality
(d) Hours of training

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46. All are included in National Rural Health Mission (NRHM) except:
(a) Strengthening of JSY (Janani Suraksha Yojana
(b) Formation of family health and social welfare societies
(c) State and district health mission
(d) Recruitment and training of ASHA

47. ASHA is recruited under?
(a) NRHM
(b) National urban health mission
(c) ICDS
(d) Village health system

48. ASHA full form is:
(a) Accredited Social Health Activist
(b) A Social Health Agent
(c) A Specific Health Agent
(d) Advanced Scientific Health Activist

49. NRHM was started in:
(a) 2005 (b) 2006
(c) 2007 (d) 2009

50. ASHA gets remuneration on all except:
(a) Institutional delivery
(b) Zero dose of OPV and BCG
(c) Recording birth weight
(d) Birth registration

51. All are true about Janani Shishu Suraksha Karyakram (JSSK), except:
(a) Free diet to mother during hospital stay
(b) Free delivery
(c) Free transport from home to hospital and back
(d) Free treatment of sick infants up to 1 year

52. Asha worker works for ÖÖ population:
(a) 3000 (b) 1000
(c) 5000 (d) 400

53. ASHA is located at:
(a) Subcentre (b) PHC
(c) CHC (d) Village

54. Under National Rural Health mission who will be the link person between community and health care services?
(a) Anganwadi worker (b) TBA
(c) ASHA (d) ANM

55. All are correct statement about ASHA except:
(a) Female trained village guide
(b) One per village
(c) One per 1000 population
(d) Female untrained guide

56. Multi drug therapy (MDT) is treatment for:
(a) TB (b) Leprosy
(c) HIV (d) All of the above

57. Treatment duration for multibacillary leprosy is:
(a) 12 months (b) 18 months
(c) 24 months (d) 5 years

58. Multibacillary leprosy follow-up duration:
(a) 12-18 months (b) 2 years
(c) 5 years (d) 10 years

59. In multibacillary leprosy, the follow-up examination after adequate treatment should be done for
(a) 3 years (b) 5 years
(c) 10 years (d) 2 years

60. National Leprosy Eradication Programme started in:
(a) 1949 (b) 1955
(c) 1973 (d) 1983

61. Two years duration in terms of leprosy is with regard to:
(a) Treatment of paucibacillary leprosy
(b) Treatment of multibacillary leprosy
(c) Post-treatment surveillance of paucibacillary leprosy
(d) Post-treatment surveillance of multibacillary leprosy

62. The best indicator for monitoring the impact of Iodine Deficiency Disorders control programme is:
(a) Prevalence of goiter among school children
(b) Urinary iodine levels

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(c) Neonatal Hypothyroidism
(d) Iodine level in soil

63. Under National programme for prevention of nutritional blindness, a child in the age group of 6-11 months is given a mega dose of vitamin A equal to:
(a) 50,000 IU (b) 1 lakh IU
(c) 1.5 lakh IU (d) 2 lakh IU

64. The Vitamin A supplement administered in "Prevention of nutritional blindness in children programme" contains:
(a) 25,000 IU/ml (b) 1 lakh IU/ml
(c) 3 lakh IU/ml (d) 5 lakh IU/ml

65. Blood smear must be made at night for which of the following conditions?
(a) Malaria (b) Filaria
(c) Leprosy (d) Onchocerciasis

66. Minimum level of iodine in iodized salt reaching the consumer level according to Iodine programme should be:
(a) 15 ppm (b) 30 ppm
(c) 5 ppm (d) 20 ppm

67. Rashtriya Swasthya Bima Yojana, all are true except:
(a) Applicable for BPL only
(b) Entitled for 30000 rupees
(c) Pay and reimbursement follows
(d) Is a type of employment scheme

68. Rashtriya Swasthya Bima Yojana is:
(a) Government run insurance scheme for its employees
(b) Government run insurance scheme for all citizens
(c) Government run insurance scheme for poor
(d) Private insurance company run scheme for all poor

69. True about Rashtriya Swasthya Bima Yojana is:
(a) Applies to BPL families only
(b) Annual cover is Rupees 30000/- per family member
(c) 75% premium is borne by family
(d) Implemented all over India

70. Mental health programme was started in:
(a) 1982 (b) 1987
(c) 1990 (d) 1995

71. National Program for Prevention and Control of Cancer, Diabetes, Cardiovascular diseases and Stroke (NPCDCS), true is
(a) Separate centre for stroke, DM, cancer
(b) Implementation in some 5 states over 10 districts
(c) District hospital has specialised facilities
(d) Subcentre has facility for diagnosis and treatment

72. True about National Program for Prevention and Control of Cancer, Diabetes, Cardiovascular diseases and Stroke is
(a) Home based care is not given
(b) Implementation in some 5 states over 10 districts
(c) Separate centre for stroke, DM,
(d) CHC has facilities for diagnosis and treatment of CVD, Diabetes

73. Most sensitive indicator of Hypothyroidism in a community is
(a) T4
(b) Neonatal hypothyroidism
(c) TSH
(d) Median urinary iodine excretion

74. What is the new change in National Program on Prevention and Control of Diabetes, Cardiovascular diseases and Stroke?
(a) Opportunistic screening
(b) Awareness of lifestyle and behavior related diseases
(c) Specialized units at Medical colleges
(d) Integration with National Cancer Control Program

75. True about Mid-day meal given in school is:

	Calories	Proteins
(a)	1/3	1/2
(b)	1/3	1/3
(c)	1/2	1/2
(d)	1/2	1/3

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76. Duration of treatment in multibacillary leprosy according to WHO is:
(a) 6 months (b) 1 yr
(c) 2 yrs (d) 5 yrs
(e) Life-long

77. All are true of Midday School Meal Programme except:
(a) Should supply daily protein and S! rd or daily calories
(b) Is a substitute for regular food
(c) Locally available foods are used
(d) Cheap and easy to prepare

78. Single massive dose of vitamin A for preventing the deficiency in preschool children between the age of 1-6 years for every 6 months is:
(a) 2,000 IU (b) 20,000 IU
(c) 2,00,000 IU (d) 20,00,000 IU

79. WHO funds which of the following programs in India?
(a) RNTCP
(b) National Leprosy Eradication Programme
(c) Janani Suraksha Yojana
(d) National old age pension plan

80. Integrated Child Protection Scheme is under which ministry?
(a) Health & Family Welfare
(b) Women & Child Development
(c) Home Affairs
(d) Labour

81. ICDS was launched in
(a) 1955 (b) 1968
(c) 1975 (d) 2005

82. Directly observed treatment (DOTs) agents is under:
(a) Revised National Tuberculosis Control Programme
(b) Reproductive and Child Health (RCH) Programme
(c) National AIDs Control Programme
(d) National Leprosy Eradication Programme

Answers of MCQ on National Programme

1. Ans. (b) 2, 4 and 6 months
2. Ans. (c) Isoniazid and Rifampicin
3. Ans. (c) 10-15 persons per year
4. Ans. (a) Short-term treatment under supervision
5. Ans. (b) Directly observed
6. Ans. (a) 1 out of 2 samples positive
7. Ans. (a) Decrease in resistance by mutation
8. Ans. (a) 1 out of 2 sputum positive
9. Ans. (b) Chest X-ray
10. Ans. (a) All children between 0—5 years of age on a single day, irrespective of their previous immunization status
11. Ans. (c) 0-5 years
12. Ans. (b) Live
13. Ans. (a) 0-5 yrs children
14. Ans. (d) Tuberculosis
15. Ans. (c) Reduce the under five mortality to half
16. Ans. (b) Clean towel & Clean water for hand washing
17. Ans. (c) 65%
18. Ans. (a) 20 mg iron & 100 micrograms folic acid
19. Ans. (c) Feed to malnourished children
20. Ans. (d) All of the above
21. Ans. (d) All
22. Ans. (d) 400 mcg
23. Ans. (c) Tertiary level
24. Ans. (d) Visual acuity < 3/60 in the better eye with best correction
25. Ans. (c) A-IV, B-I, C-III, D-II
26. Ans. (d) Glaucoma
27. Ans. (b) Epidemic conjunctivitis
28. Ans. (c) 50000
29. Ans. (b) Providing ART to 3 million people by 2005
30. Ans. (c) 3
31. Ans. (b) Transfusion of blood/ blood products
32. Ans. (a) Single dose of Nevirapine mother and child

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33. Ans. (d) 1097
34. Ans. (a) 200 mg
35. Ans. (b) Insecticidal spray with rounds of HCH every 6 weeks
36. Ans. (c) Plasmodium ovale
37. Ans. (b) Annual blood examination rate
38. Ans. (c) Cholera
39. Ans. (c) Anti-larval measures
40. Ans. (b) Cover overhead tanks properly
41. Ans. (a) Fortnightly
42. Ans. (c) ASHA is skilled birth attendant
43. Ans. (c) Accredited Social Health Activist
44. Ans. (d) Village Level
45. Ans. (c) Reduction in infant mortality
46. Ans. (b) Formation of family health and social welfare societies
47. Ans. (a) NRHM
48. Ans. (a) Accredited Social Health Activist
49. Ans. (a) 2005
50. Ans. (b) Zero dose of OPV and BCG
51. Ans. (d) Free treatment of sick infants up to 1 year
52. Ans. (b) 1000
53. Ans. (d) Village
54. Ans. (c) ASHA
55. Ans. (d) Female untrained guide.
56. Ans. (b) Leprosy
57. Ans. (a) 12 months
58. Ans. (c) 5 years
59. Ans. (b) 5 years
60. Ans. (d) 1983
61. Ans. (c) Post-treatment surveillance of paucibacillary leprosy
62. Ans. (b) Urinary iodine levels
63. Ans. (b) 1 lakh IU
64. Ans. (b) 1 lakh IU/ml
65. Ans. (b) Filaria
66. Ans. (a) 15 ppm
67. Ans. (d) Is a type of employment scheme
68. Ans. (c) Government run insurance scheme for poor
69. Ans. (a) Applies to BPL families only
70. Ans. (a) 1982
71. Ans. (c) District hospital has specialised facilities
72. Ans. (d) CHC has facilities for diagnosis and treatment of CVD, Diabetes
73. Ans. (d) Median urinary iodine excretion
74. Ans. (d) Integration with National Cancer Control Program
75. Ans. (a) 1/3
76. Ans. (b) 1 yr
77. Ans. (b) Is a substitute for regular food
78. Ans. (c) 2,00,000 IU
79. Ans. (a) RNTCP
80. Ans. (b) Women & Child Development
81. Ans. (c) 1975
82. Ans. (a) Revised National Tuberculosis Control Programme

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Syllabus

National Health Policy (NHP) and the scope of Ayurveda in NHP.

Learning objectives

Describe the National Health Policy (NHP) and the scope of Ayurveda in NHP.

Total – 2 hours (Lecture :1 hours, Non lecture: 1 hours)

MCQ- Yes- SAQ (5 Marks)- Yes- LAQ (10 Marks)- No

The National Health Policy (NHP) is a declaration made by the Government of India that serves as a "blueprint" for future action regarding how duties linked to health and related issues should be carried out. It aspires to end inequality, poverty, ill health, illiteracy, and all of these things. NHP was finalized by the Ministry of Health and Family Welfare in 1982, with the goal of HFA by 2000 AD and NHP was approved in August 1983. The main objective of the policy was to achieve HFA by 2000 AD, i.e. to achieve a level of health that will enable every individual to lead socially and economically a productive life, through the universal provision of comprehensive primary health care services.

Priority areas of the policy

1. Small family norm
2. Maternal and child health
3. Immunization program
4. Improvement of nutritional status
5. Water supply and sanitation
6. Environmental protection
7. School health program
8. Occupational health service
9. Prevention of food adulteration and maintenance of quality of drugs

Other Strategies of NHP, 1983

1. Prohibition of private practice by Government Doctors, in a phased manner.
2. Exploitation of the services of the practitioners of AYUSH system of medicine such as Ayurveda, Yoga (Naturopathy), Unani, Siddha and Tibbi and Homeopathy.
3. Inculcation of healthful living habits by the people by nation-wide health education programs.
4. Inclusion of nutrition promotion and population control techniques in school curricula.
5. Universal adult literacy education.
6. Nationwide health information system for timely warning of emergencies, planning of health strategies and determining the manpower requirements.
7. Promotion of herbal gardening and health industry to increase the production of drugs, biomedicals, vaccines and essential medical equipment.
8. Initiation of state wise health insurance schemes for raising additional funds for health.
9. Promotion of basic and applied research.
10. Establishment of intersectoral coordination.
11. Training of all categories of medical personnel.

NHP 1983, was perceived to achieve HFA by 2000 AD through universal provision of primary health care services, not visualizing enormous resources necessitated to achieve the goal.

Contrastingly NHP 2002 is projected as a

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realistic document based on a conceptional and operational framework that is consistent with the socioeconomic realities prevailing in India.

Objectives- Objective is to achieve an acceptable standard of good health among the people of the country, by increasing the access to the health services by decentralizing the public health system by establishing the new health infrastructures, by emphasizing primary level of health care, by promoting rational use of drugs, by increasing primary health investment and by enhancing private-sector participation.

Goals

Goals of NHP–2002, to be achieved by 2005-2015 are:

- Eradication of poliomyelitis and yaws – 2005
- Elimination of leprosy – 2005
- Elimination of kala-azar – 2010
- Elimination of lymphatic filariasis – 2015
- Achieve zero level growth of HIV/AIDS – 2007
- Reduce mortality by 50 percent on account of TB, malaria and other water-borne and vector-borne diseases by – 2010
- Reduce prevalence of blindness to, 0.5 percent– 2010
- Reduce IMR to 30/1000 LB and MMR to 1/ 1000 LB (i.e. 100/Lakh LB) – 2010
- Increase utilization of public health facilities from current level of < 20 to > 75 percent – 2010
- Establish an integrated system of surveillance, health statistics and health accounting by – 2005.

Scope of Ayurveda in National Health Policy

The potential of AYUSH has been substantially supported by the National Health Policy (NHP) 2017 within a diverse system of integrative healthcare. The National Health Plan for 2017 (NHP 2017) reiterates the necessity of integrating AYUSH in the National Health Mission, research, and teaching while using the language of "medical pluralism."

In the context of AYUSH, the NHP 2017 has a very broad accessible. It usually acknowledges that India has a medical pluralism with a heightened role for AYUSH. It implies that AYUSH services will be mainstreamed in three dimensions. NHP 2017 highlights integrative practises led by protocols as a means of achieving national health goals. It emphasises the significance of scientific proof for the security and efficacy of AYUSH treatments, and it underlines the requirement for growing capacities and a critical mass of qualified professionals through high-quality education and training at both the national and international levels. For the efficient execution of NHP 2017, AYUSH stakeholders must now create a clear plan and strategy.

MCQ on National Health Policy

1. What is the goal concerning HIV/AIDS in National Health Policy 2002?
   (a) Eliminate HIV/AIDS by 2007
   (b) Eradicate HIV/AIDS transmission by 2007
   (c) Achieve zero level of growth of HIV/AIDS by 2007
   (d) Eliminate HIV/AIDS by 2015
2. According to National Health Policy 1983, the target i s to reduce incidence of LBW to below———— by 2000:
   (a) 20% (b) 15%
   (c) 10% (d) 5%
3. National Health Policy for 2010 includes:
   (a) IMR < 30/1000
   (b) Control of Non communicable disease
   (c) MMR < 200/100000
   (d) Registration of birth and deaths – 80%
   (e) 80% couple protection rate.
4. India aims to eliminate _____by 2015:
   (a) Malaria (b) TB
   (c) Filariasis (d) HIV
5. Maternal mortality must be reduced to less than:
   (a) 100 (b) 200
   (c) 300 (d) 400

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6. Which of the following is not a goal for 2010 as per National Health Policy 2002?
   (a) Reduce mortality by TB by 50%
   (b) Eliminate kala azar
   (c) Reduce IMR
   (d) Eradicate polio
7. National health policy true ALL/except:
   (a) Eradicate polio-2005
   (b) Eliminate leprosy-2005
   (c) Eliminate lymphatic filariasis- 2010
   (d) Achieve zero level growth of HIV-2007
8. According National health policy 2002, which of the following is to be eliminated by 2015?
   (a) Malaria (b) Kala azar
   (c) Leprosy (d) Filariasis
9. National health policy is based on:
   (a) Primary health care (b) Tertiary care
   (c) Child care (d) Mother Care

Answers of MCQ on National Health Policy

1. Ans. (c) Achieve zero level of growth of HIV/AIDS by 2007
2. Ans. (c) 10%
3. Ans. (a) IMR < 30/1000
4. Ans. (c) Filariasis
5. Ans. (a) 100
6. Ans. (d) Eradicate polio
7. Ans. (c) Eliminate lymphatic filariasis- 2010
8. Ans. (d) Filariasis
9. Ans. (a) Primary health care

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Causative organism and Incubation Period of Diseases

Disease	Causativeorganism	Incubation Period
Chicken pox	Human (alpha) herpes virus 3	14 – 16 days
Measles (Rubeonella)	RNA paramyxovirus	10 – 14 days
Rubella (German Measles)	RNA Togavirus	14 – 21 days
Mumps	RNA Myxovirus	14 – 21 days
Influenza	Orthomyxovirus	18 – 72 hours
Diphtheria	Corynebacteriumdiphtheriae	2– 6 days
Pertussis(Whooping cough)	Bordetella pertussis	7– 14 days
Meningococcalmeningitis	Neisseria meningitis	3– 4 days
SARS	Corona virus	3– 5 days
Tuberculosis	Mycobacteriumtuberculosis	Weeks– years
Poliomyelitis	Poliovirus	7– 14 days
HepatitisA	Enterovirus 72 (Picornavirus)	15 – 45 days
HepatitisB	Hepadnavirus	45 – 180 days
Hepatitis C	Hepacivirus	30 – 120 days
Cholera	Vibriocholerae	1– 2 days
Typhoidfever	Salmonellatyphi	10 – 14 days
Staphylococcal food poisoning	Staphylococcus aureus	1– 6 hours
Ascariasis	Ascaris lumbricoides	2months
Ancylostomiasis (Hookworm)	A.duodenale	5 weeks –9 months
Malaria	Plasmodiumvivax	8– 17 days
	Plasmodiumfalciparum	9– 14 days
	Plasmodiummalariae	18 – 40 days
	Plasmodiumovale	16 – 18 days
Lymphatic filariasis	Wuchereriabancrofti	8– 16 months
Dengue Fever	B arborvirus (dengue types 1, 2, 3, 4)	3 to 14 days, commonly 5 to 7 days.
Chikungunya fever	Chikungunyavirus (Arbovirus A)	4– 7 days
Leishmaniasis (Kala Azar)	Leishmania donovani	4 - 7 days
Rabies	Lyssavirus type 1 (Rhabdovirus)	3– 8 weeks
Yellowfever	Flavivirus fibricus	2– 6 days
Japanese encephalitis	GroupB arbovirus (Flavivirus)	5– 15 days
KFD	Arbovirus (Flavivirus)	3– 8 days
Chikungunya fever	Chikungunyavirus (Arbovirus A)	4– 7 days
Leptospirosis	Leptospira interroguns	4– 20 days
Bubonic plague	Yersinia pestis	2– 7 days
Pneumonic plague	Yersinia pestis	1– 3 days
Septicemic plague	Yersinia pestis	2– 7 days

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Mode(s) of Transmission of Diseases

Disease	Mode(s) of transmission	Remarks
Chicken Pox	Droplet infection, droplet nuclei.	Facetofacetransmission
Measles	Droplet infection, droplet nuclei, through conjunctiva	4 days before rashto5 dayslater
Rubella	Droplet infection, droplet nuclei, vertical	1 week before rashto1 weeklater
Mumps	Droplet infection, direct contact	
Influenza	Droplet infection, droplet nuclei	
Diphtheria	Dropletinfection, direct contact, fomite borne	95% transmissionfromcarriers
Whooping Cough	Dropletinfection, directcontact, fomite	
Meningococcal	Droplet infection	Carriersmost importantsource of infection
TB	Droplet infection, droplet nuclei.	Not Fomite borne
Poliomyelitis	Faeco-oral, dropletinfection	
HepatitisA	Faeco-oral, parenteral, sexual	
HepatitisB	Perinatal, parenteral, sexual, horizontal	
Hepatitis C	Perinatal, parenteral, sexual	
Hepatitis D	Perinatal, parenteral, sexual	Super-infection/co-infectionto HBV
HepatitisE	Feco-oral	
Cholera	Feco-oral, contaminated foods/drinks, direct contact	
Typhoid	Feco-oral, urine-oral	
Amoebiasis	Feco-oral	
Ascariasis	Feco-oral	
Ancylostomiasis	Direct penetration (skin), oral	Transmissionmay be perennial
Dracunculiasis	Consumption of water containingcyclops	Waterbaseddisease
Dengue	Aedes bite	Waterbreedingdisease
Leptospirosis	Urine, feces,tissuesofrats	Direct skin contact
Nipah virus	Consumptionofbats-eatenfruits	Person-to-person in India
Ebolavirus	Body fluids (blood, semen, urine, feces, vomit, tears, sweat, saliva)	–
Brucellosis	Directcontact,food borne, air borne	Abortedoffoetus,placenta cantransmit

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Vectors and Diseases Transmitted

Vector	Disease(s) transmitted
Housefly (Musca domestica)	Diarrhoeal and dysentrical diseases, Poliomyelitis, Yaws, Anthrax, Trachoma
Sandfly (Phlebotamusargentipes)	Kala azar (Visceral Leishmaniasis), Oriental sore (Cutaneous Leishmaniasis), Sandfly fever, Oroya fever
Tse-Tse fly (Glossina palpalis)	Sleeping sickness of Africa (African Trypanosomiasis)
Reduviid bug (Triatominae)	Chagas Disease (Sleeping sickness of America- American Trypanosomiasis)
Black fly (Simulum)	Onchocerciasis (River Blindness)
Soft tick	Relapsing fever, Q fever, KFD (outsideIndia)
Hard tick	Tularemia, Babesiosis, KFD (India), Tick paralysis, Tick encephalitis, Tick hemorrhagic fever, Indian Tick Typhus, RMSF
Louse	Epidemic typhus, Trench fever, Relapsing fever
Mite	Scrub typhus, Rickettsial pox
Flea	Plague, Murine typhus
Anopheles mosquito	Malaria, Filaria (outside India)
Culex mosquito	Bancroftian Filariasis, Japanese Encephalitis, West Nile fever, Viral arthritis
Aedes mosquito	Yellow fever, Dengue, DHF, Chikungunya, Rift Valley fever, Filariasis (Outside India)
Mansonoides mosquito	Malayan (Brugian) filariasis, Chikungunya

Bacille Calmette-Guerin (BCG) Vaccine

Type- Live bacterial, lyophilized

Composition- Bovine strain Danish-1331(BCG strain). Minimum of 0.1 to 0.4 million bacilli/dose

Diluent- normal saline

Schedule- primary –at birth, if not given within or < 12 month

Post primary- after Mantoux test

Booster- none

Administration-

Dose- 0.05 ml for < 1 month, 0.1 from>1 month

Route- strictly intradermal

Site- Upper left arm just above the insertion of deltoid

Unwanted reaction- prolonged ulceration, local abscess, sinus, and lymphadenitis

Contraindication- Symptomatic HIV infection, immunodeficiency, pregnancy, generalized eczema,

Special precautions- only tuberculin syringe and needle is used. Correct intradermal injection is given. No other injections are given for 6 month to that arm. Unused reconstituted vaccine is discarded after 6 hours or the end of the session whichever is earlier, protect the vaccine from direct exposure to sunlight

Storage- 2 to 8 ^{0}C

Protective value- 15-20 year up to 80 percent

Availability- freeze- dried powder form along with diluents- normal saline vial of 10 doses (1 ml= 1mg)

Oral Polio Vaccine - (OPV)

Type- live trivalent

Composition : Type 1:3,00,000 tissue culture infection doses (TCID) 50

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Type 2:1,00,000 tissue culture infection doses (TCID) 50

Type 3:3,00,000 tissue culture infection doses (TCID) 50

Magnesium chloride is used as a stabilizer

Schedule

Primary- 4 doses completed before 6 month

Additional - 2 doses

1st dose at 12-18 month with DPT vaccine

2nd dose at 5th year DT vaccine

Administration

Dose- 2 drops

Route- oral

Site- mouth

Unwanted reaction- almost nil

Contraindication-Symptomatic HIV infection, immunodeficiency. (In immunodeficiency, inactivated poliovirus vaccine (IPV) is preferred)

Special precautions- hot milk, food or water is withheld for half an hour, cold- chain is maintained, vaccine is administrated in cool place, potency is monitored by Vaccine vial monitor (VVM).

Storage-2 to 8 ^{0}C

Protective value- Lifetime

Availability-2 ml (20dose) vial with dropper.

Diphtheria- Pertussis-Tetanus Vaccine (DPT)

Type-Triple antigen containing Diphtheria toxoid + Killed whole cells of the organism that causes Pertussis

Composition- Each 0.5 ml contains

Diphtheria toxoid-20 Lf (limit of flocculation)

Tetanus toxoid- 0.5 Lf

Pertussis killed- 20,000 million

Adjuvant: Aluminum phosphate- 2.5 mg preservative- thiomesol-0.01 percent.

Schedule

Primary- 6, 10 and 14 week of age

Booster- 18 month- DPT, 5 year (school entry)- DT only

Administration

Dose- 0.5ml

Route – deep intramuscular

Site- Outer mid-thigh (infants), outer upper arm, Gluteal region in old child.

Unwanted reaction- mild local, fever, rarely convulsions

Contraindication- anaphylactic reaction to previous dose, progressive neurological disease

Special precautions- never freeze, shake the vial to mix before vaccination

Storage-2 to 8 ^{0}C

Protective value-Durable

Availability-10 ml vial

Measles Vaccine

Type- live attenuated, freeze-dried

Composition- 1000 TCD 50 Edmonston-Zagreb (EZ) strain per 0.5 ml

Schedule

Primary- 1 dose in 9 month in non-endemic area

6th and 9th in endemic area risk group

Booster- nil, infants vaccinated below 9 month deserve another dose at 12th month.

Administration

Dose- 0.5 ml

Route- Subcutaneous

Site- upper arm/ outer mid-thigh

Unwanted reaction- mild fever and rash, rarely toxic shock syndrome (TSS), anaphylaxis

Contraindication- Pregnancy, untreated active TB, immune disorder

Storage-2 to 8 ^{0}C

Protective value- Lifetime

Availability- Vial with powder and separate diluent

Tetanous Toxoid Vaccine

Type- Toxoid monovalent, inactivated Toxin

Composition- Tetanus toxoid

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Schedule

Route- Apart from DTP and DT, 2 doses of TT given at 10th and 16th year.

Pregnancy- 2 dose in first pregnancy, 4 to 6 week apart

1 dose in second pregnancy, if within 3 year.

Administration

Dose- 0.5 ml

Route- Intramuscular (IM)

Site-Outer upper arm

Unwanted reaction- mild local pain

Contraindication- H/O previous allergy, acute and severe infections

Storage-2 to 8 ^{0}C, never freeze. Withstands up to 37^{0}C

Protective value-20 year

Availability-Liquid in vials/ ampule

Hepatitis B Vaccine

Type- Monovalent antigen, plasma derived vaccine

Composition- 20 micrograms of 22 nm surface antigen particles (HBsAg) per ml

Schedule

Primary- 3 doses at 0, 1, and 6 month

Booster- every 5 year

Administration

Dose-0.5 mlfor children <10 year, 1 ml for >10 year

Route- Intramuscular (IM)

Site-Outer mid-thigh/ outer upper arm

Unwanted reaction- rarely local redness and fever

Contraindication- hypersensitivity to previous dose

Special precaution- not administered to gluteal region, as the response is poor

Storage-2 to 8 ^{0}C, never freeze.

Protective value-95 percent for 5 years

Availability- Cloudy Liquid in single / multi dose

Rabies Vaccine- Beta Propiolactone (BPL)

Type- Inactivated nervous tissue vaccine

Composition- fixed virus grown on sheep brain

Schedule

Primary-daily for 7 to 10 days

Booster-Ifpassive immunization is given, three additional post- primary doses on 10th, 20th and 90th day is recommended.

Administration

Dose- 2-5 ml daily for 7 -10 days depending upon wound type

Route-Deep subcutaneous using 1.5 inch long needle

Site-Anterior wall of abdomen around the umbilicus

Unwanted reaction- Severe, even fatal reactions, local allergic reactions, neuroparalysis

Contraindication- Nil

Special precaution- different sites are chosen for each injection

Storage-room temperature

Protective value- 6 month

Availability-Now BPL vaccine is replaced more safe and potent cell cultured vaccine

Rabies Vaccine- Cell Cultured Vaccine

Type- Cell cultured- human diploid cell culture vaccine

Composition- inactivated rabies virus, flurry low egg passage strain

Schedule

Primary -0, 3, 7, 14, 28 day

Started- as soon as possible after exposure

Booster 90th day

Administration

Dose- 1 or 0.5 ml dose dependent of age, sex and weight

Route- Intramuscular

Site- Deltoid region

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Unwanted reaction- local redness, fever

Contraindication- Nil

Special precautions- To be used immediately after reconstitution

Storage- 2 to 8 °C, should not be freeze

Protective value- 15 day to 3 month

Availability- ampoule with sterile water and syringe

DTP+HEP B+HIB

Type- Pentavalent, freeze –dried

Composition- Diphtheria, Tetanus, Pertussis, Hepatitis B, Haemophilus Influenza B

Schedule

Primary- 6, 10, 14 week of age (before 6 year of age)

Booster- None

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Administration

Dose- 0.5 ml

Route- Intramuscular (IM)

Site- outer mid-thigh

Unwanted reaction- Local inflammation, mild fever

Contraindications- severe reaction to previous dose

Special precautions- not given at birth and after 6 year, used within 6 hour of reconstitution

Storage- 2 to 8 °C

Protective value- Not known

Availability- 2 dose vial

Chemical in Public Health

Phenol

Identification- Phenol (Carbolic Acid)

Nature- Dark oily liquid with aromatic smell, crude phenol is mixture of phenol and cresol

Action- chemical disinfectant, two percent of phenol destroys and inhibits the growth of harmful microbes by coagulating the protoplasm of bacteria

Uses- Used as disinfectant and deodorant (> 10%)

Used on inanimate objects and excreta

Used as deodorant (10%)in toilets and for mopping floors (5%)

Pure phenol is used as a standard to compare the germicidal activity of disinfectants.

Dettol

Identification- Dettol

Nature- Chloroxylenol- Antiseptic (used on living tissue)

Action- Active against gram +ve but not on gram –ve bacteria, inactivated by organic matter

Uses- To clean wound and ulcers. 5% is used for general disinfection of – instruments, plastic equipment (contact period 15 minute)

Savlon

Identification- Savlon

Nature- disinfectant- Quanternary ammonium compound

Combination of Cetavlon and Hibitane

Action- Surface disinfectant

Uses- Disinfection of plastic (20 min.), thermometer (3 min.), disinfection of wounds.

Bleaching Powder

Identification- Bleaching Powder ($Cacl_2$)

Nature

- White amorphous powder with pungent smell of chlorine
- Chlorinated lime is called bleaching powder
- Fresh bleaching powder contains 33 percent of available chlorine
- Rapidly loses its chlorine content on exposure to air, light and moisture
- Hence, stored in dark, cool and dry place in closed, non-erosive containers.

Action- Germicidal- effect is by hypochlorous acid, nascent oxygen and chlorine

Uses- Disinfection of water. Disinfection of faeces, urine and pus. Used as a toilet deodorant.

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About the Book

The present book is basically intended for the Under Graduate students of Ayurveda studying in 2nd Professional B.A.M.S. Arrangement of chapter in this text book of Swasthavritta Evam Yoga according to Course Curriculum for Second Professional BAMS (Prescribed By NCISM). Important references for Bruhatrayis and Laghutrayis and some relevant books like Upanishad, Varaha Samhita have been collected. In Paper 1 all the concept of Dinacharya, Ratricharya, Rutucharya, Roganutpadaniya, Sadvritta, Ahara, Rasayana for Swastha are explain. Yoga chapter includes references from Patanjali Yoga Sutra, HathayogaPradipika, Shiva Samhita and Gheranda Samhita and Naturopathy principles, different modes of treatment like Hydrotherapy, Mud therapy, Fasting therapy and Color therapy etc. with indications and applications are explained. In Paper II - Concept of Janapadodhwamsa, Environmental Health, Disaster Management, Occupational Health, School Health services, Primary health care, Mother and child health, Family welfare programme, Preventive geriatrics, Vital Statistics, Health administration and National health programmes are explained briefly. Highlighted all most all the concepts of Swasthavritta and Yoga in a simple language with illustration of tables, chart, and images.

Other authorship extends to other books such as :

1. Text book of Swasthavritta
2. Research Methodology and Medical statistics (Under Graduate) for BAMS course
3. Research Methodology and Medical Statistics (Post Graduate) for MD/MS Ayurveda
4. Charaka Samhita Vol-I (Sutra Sthana), Vol-II (Nidana, Vimana, Sharira and Indriya Sthana), Vol-III (Chikitsa Sthana I-XV), Vol-IV Chikitsa Sthana XVI-XXX) and Vol-V (Kalpa and Siddhi Sthana)
5. Charaka Samhita Sampurna Shloka Arohi
6. Ashtanga Hridaya Sampurna Shloka Arohi
7. Sushruta Samhita Sampurna Shloka Arohi
8. Text book of Kriya Sharira (Human Physiology) Vol. - 1 & 2
9. Sanskritam Evam Ayurveda Itihas (Sanskrit and History of Ayurveda)
10. Padarth Vijnanam (Fundamental Principles of Ayurveda and Quantum Mechanics)
11. Samhita Adhyayan - I (Study of Ayurveda Classical Text)

About the Authors

Dr. Bargale Sushant Sukumar completed Graduation, Post- Graduation in Swasthavritta and Ph.D. in Ayurveda (Swasthavritta) from Rajiv Gandhi University of Health Science, Bangalore, Karnataka. He completed M. Sc. (Yoga) from Periyar University (PRIDE), Salem Tamil Nadu and M. Sc. (Psychology) from Madurai Kamaraj University, Tamil Nadu. Currently he is working in Department of Swasthavritta and Yoga at Sri. Dharmasthala Manjunatheshwara College of Ayurveda and Hospital Hassan, Karnataka. He published many articles in National and International Peer Reviewed Journals and presented good number of papers in various International and National conferences.

Dr. Shashirekha H. K. completed Graduation and Post-Graduation in Ayurveda Samhita from Rajiv Gandhi University of Health Science, Bangalore, Karnataka and Ph.D in Ayurveda (Samhita) from Tilak Maharashtra Vidyapeeta, Pune Maharashtra. M.A. (Sanskrit) from Karnataka State Open University Mysore, Karnataka, M.Sc. (Psychology) from Madurai Kamaraj University, Tamil Nadu and M. Sc. (Yoga) from Periyar University (PRIDE), Salem Tamil Nadu. She published many articles in various Peer Reviewed International Journal.She worked as Associate Professor in the Department of Samhita and Siddhant at Sri. Dharmasthala Manjunatheshwara college of Ayurveda and Hospital Hassan, Karnataka. Currently she is Professor and Head in Department in the Samhita and Sanskrit at Faculty of Ayurveda (IMS), Banaras Hindu University (BHU), Varanasi. She is acclaimed teacher for Graduate, Post Graduate and Ph. D scholars.

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